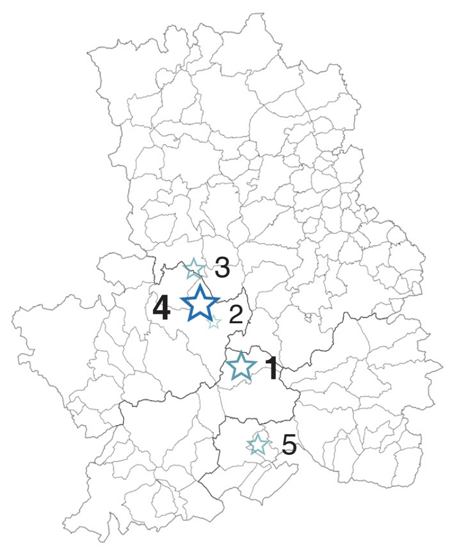
SEISMIC CRISIS FRAMEWORK

TERRITORY

8,000 km²
4 Regions
138 Municipalities



MAIN SEISMIC EVENTS

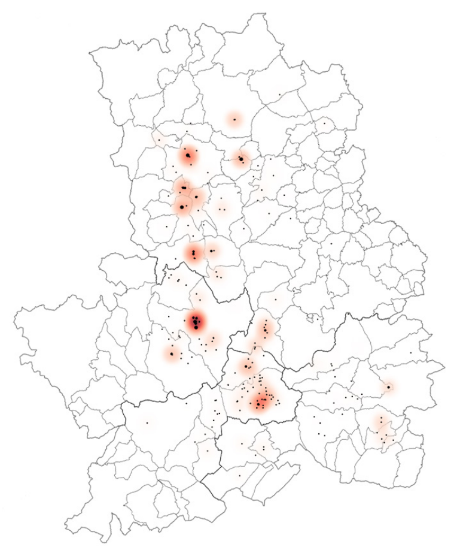
1 **2016/08/24 | Mw 6.0**
Accumoli (Lazio)

2 2016/08/24 I Mw 5.3
Norcia (Umbria)

3 2016/10/26 I Mw 5.9
Visso (Umbria)

4 **2016/10/30 | Mw 6.5**
Norcia (Umbria)

5 2017/01/18 I Mw 5.5
Capitignano (Abruzzo)



PEOPLE

600,000 people affected

299 deaths
365 wounded
49,844 displaced

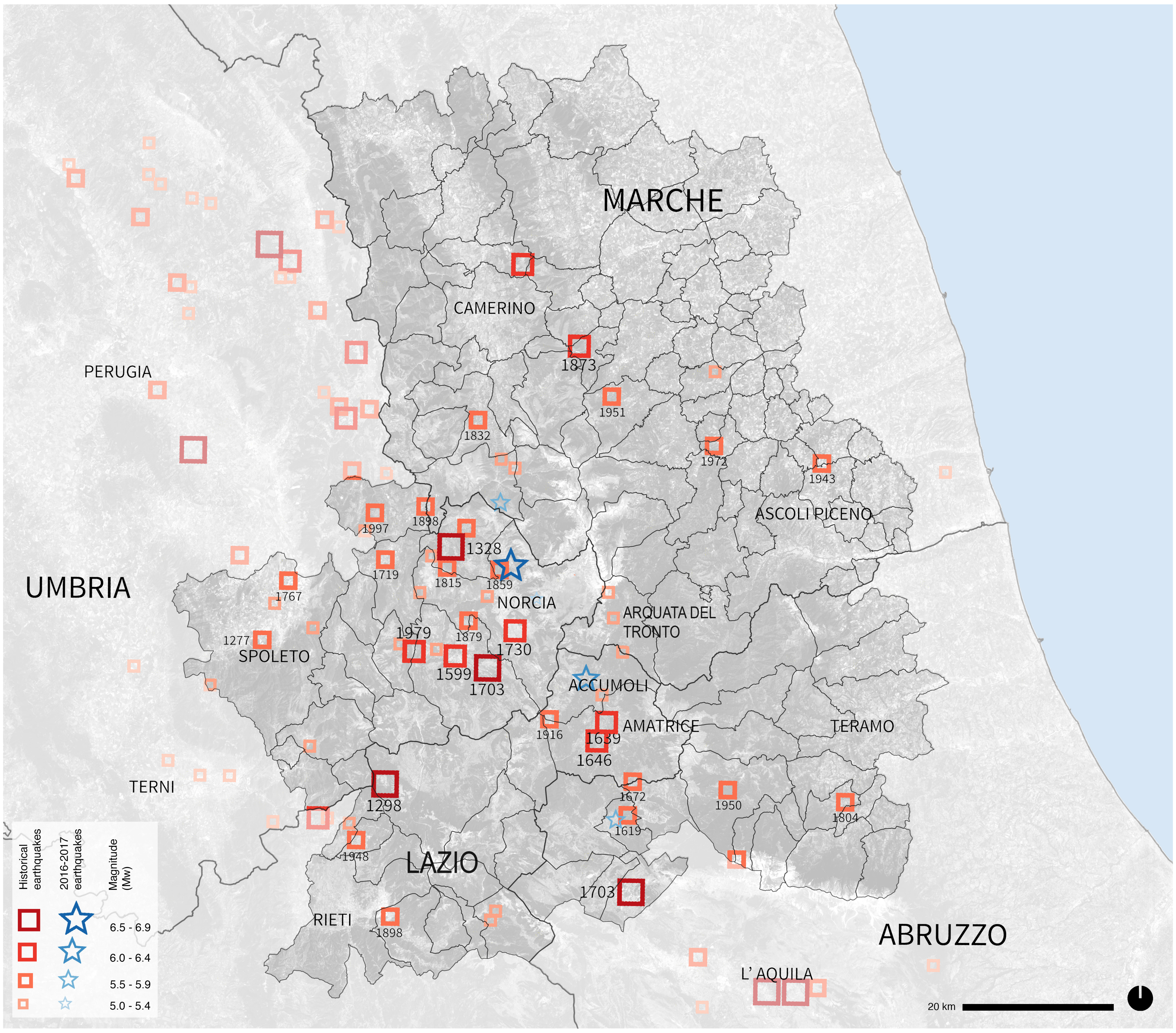
7,782 residents in S.A.E.
(Housing Emergency Solutions)

On 24 August 2016, at 3.36 a.m., an earthquake of Mw 6.0 struck Central Italy destroying Accumoli, Amatrice and Arquata del Tronto. At 4.33 a new quake, this time of magnitude 5.4, destroyed Norcia. Since then, Central Italy has shaken more than 70 thousand times, with a peak recorded at 7.40 a.m. on 30 October, between the Provinces of Macerata, Perugia and Ascoli Piceno: with a magnitude 6.5 it was the strongest earthquake in Italy in the last 50 years.
On 18 January 2017, the earthquake struck again, in Abruzzo, in the Campotosto-Montereale sector.

The balance of this seismic sequence was very heavy in terms of human lives lost, of a devastated economy and cultural heritage. The material damage, estimated by the Civil Protection at 23 billion and 530 million euros, was added to those, already huge, of the last two serious earthquakes that hit Italy in 2009, in L'Aquila, and in 2012, in the Emilia Romagna Region.

The continuation of the seismic series over time has always required new legislative responses, such as the enlargement of the original "Crater" up to the current 140 Municipalities.

The state of emergency declared by the Council of Ministers on 25 August 2016 was extended to 31 December 2019 and extraordinary management for reconstruction was extended to 31 December 2020.



CRATER ANALYSIS
THE CONFIGURATIONAL APPROACH

Spatial data (i.e. traffic network) and analysis based on urban morphology (i.e. Segment Angular Analysis - ASA), were collected and performed, according to the Space Syntax theory in a Geographic Information System (GIS), to better understand the territory's patterns, its behaviour and its inner vocation.

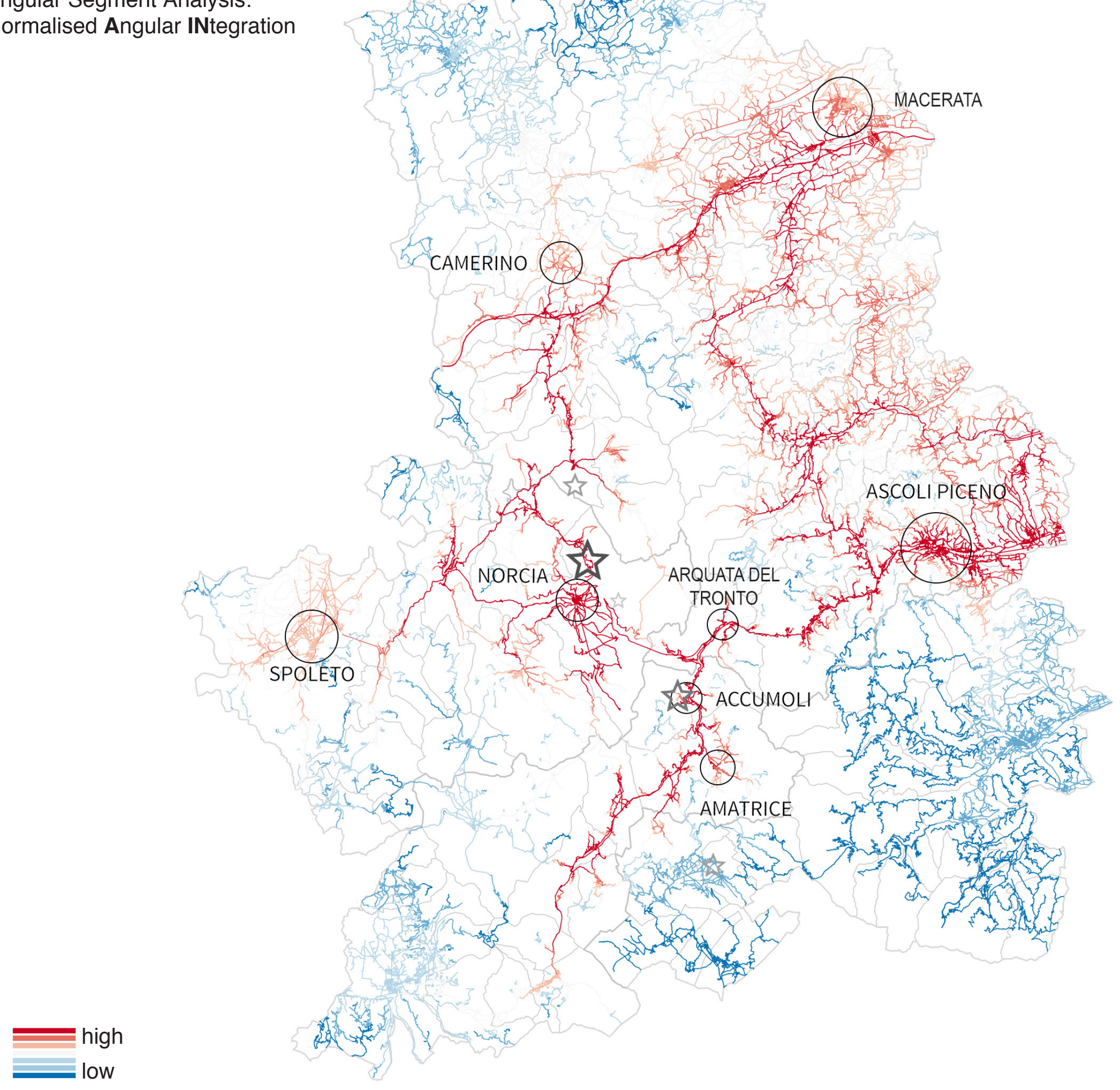
The configurational analysis's techniques assume the articulation of the urban grid as an input variable and, based on its specific configuration, infer conclusions regarding the mode of distribution of traffic currents along the routes (i.e. Choice measure) and the consequent localizations who benefit most from it (i.e. Integration measure).

Basically, high values of Choice highlight the Regional foreground traffic network and high values of Integration helps to recognize the localizations with the highest level of accessibility and attractiveness of the entire system.

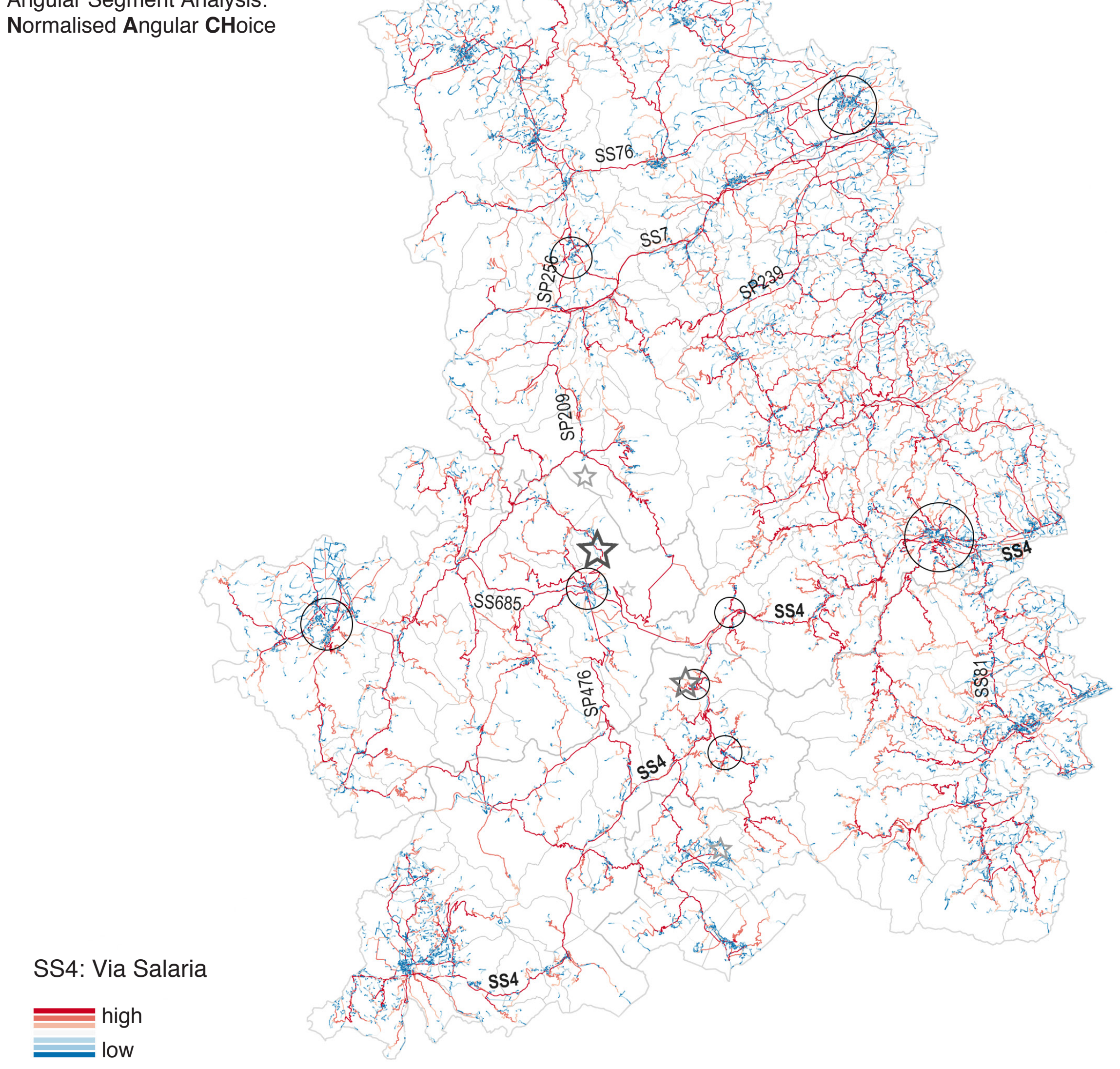
The results show the low accessibility of the territory, with a low presence of rail and road infrastructures which connect the many small local centres.
This picture finds confirmation in the 2016 Istat study in which the Municipalities inside the Crater are described as small, difficult to reach and, given the displacement difficulties and the mountainous features of the territory, with a labour market predominantly local.

[The higher values of the presented indices have a positive meaning]

CENTRALITY - To-movement
Angular Segment Analysis:
Normalised **A**ngular **IN**tegration



TRAFFIC FLOW - Through movement
Angular Segment Analysis:
Normalised **A**ngular **CH**oice



HOUSING EMERGENCY MANAGEMENT

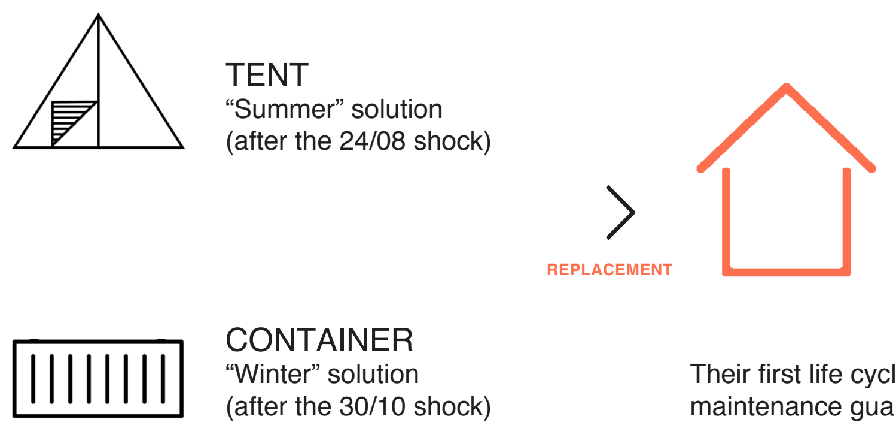
NUMBERS

Population assistance summary to 22 August 2018 (Civil Protection Department)

Region	S.A.E.[1]	Hotels	M.A.P.R.E.[2]	Container/ camper	Municipal facilities	C.A.S.[3]	Total
ABRUZZO	382	799	87	0	232	5,300	6,800
LAZIO	1,930	19	150	0	28	761	2,888
MARCHE	3,704	1,120	396	557	45	26,917	32,739
UMBRIA	1,766	5	174	85	181	5,206	7417
Total	7,782	1,943	807	642	486	38,184	49,844

[1]Housing Emergency Solutions I [2]Rural Emergency Housing Modules I [3]Autonomous Accommodation Contribution

PHASES



Short-term solutions

TENT
"Summer" solution
(after the 24/08 shock)

CONTAINER
"Winter" solution
(after the 30/10 shock)

Medium-term solutions

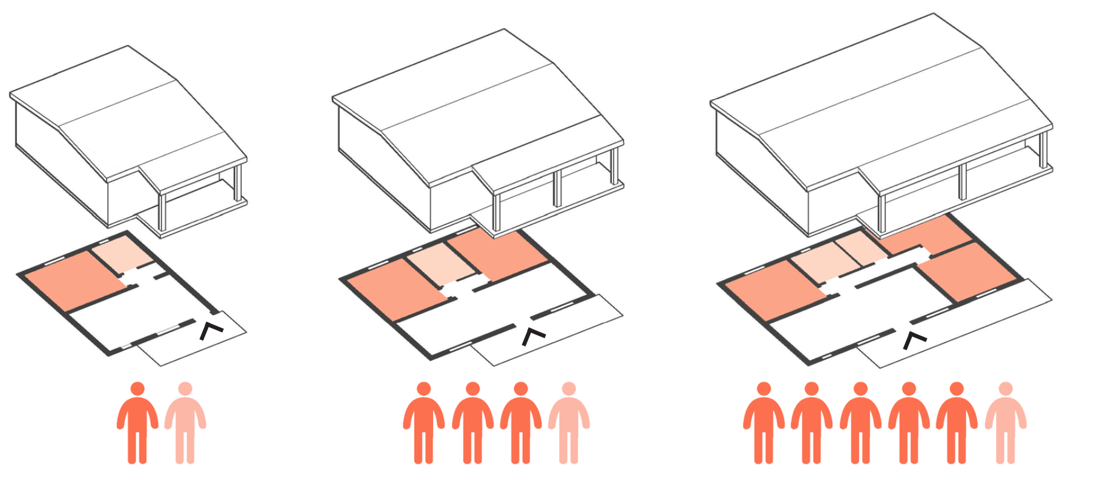
S.A.E.
Housing Emergency Solutions

Their first life cycle is **six years** (with four years of maintenance guaranteed).

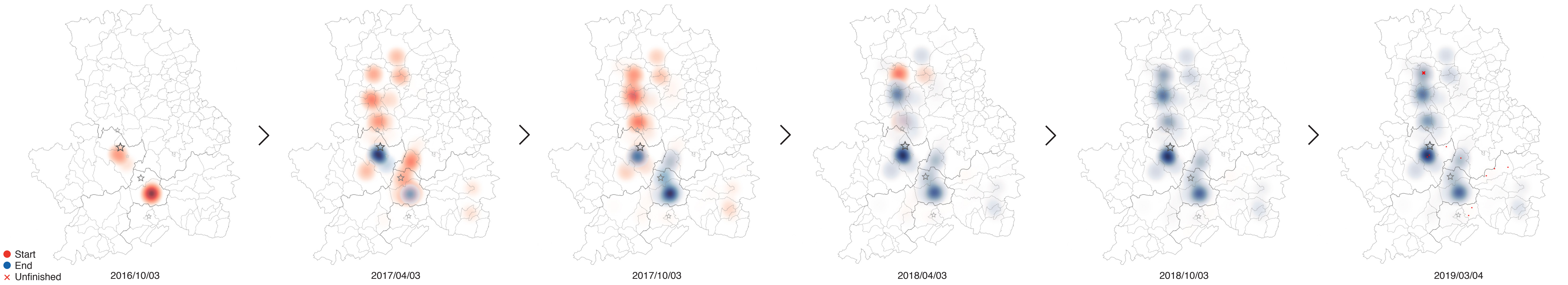
S.A.E. MODULES

CAPACITY
40 mq: 1-2 people
60 mq: 3-4 people
80 mq: 5-6 people

FUNCTIONS
● Bedroom
● Bathroom



S.A.E. REALISATION



FROM TEMPORARINESS TO PERMANENCE
THE CASE OF 'BORGO DI ARQUATA' AFTER THE 2016 CENTRAL ITALY EARTHQUAKE

Pisa University, School of Engineering
M.Sc. Architecture and Building Engineering

a.a. 2018/2019
Master thesis

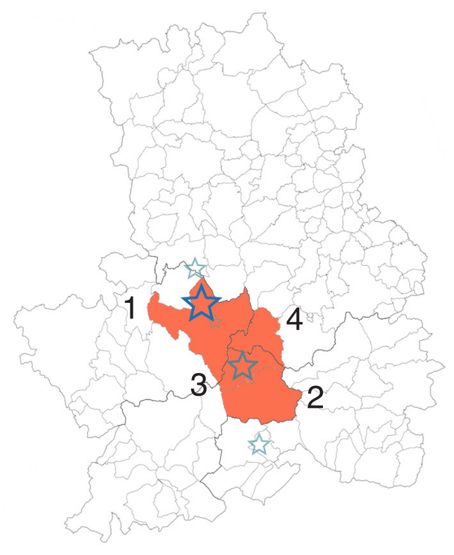
Student:
Chiara Chioni

Supervisors: Prof. Ing. Valerio Cutini, Dr. Clarice Bleil de Souza,
PhD. Arch. Simone Rusci, Arch. Ing. Camilla Pezzica

CASE STUDIES: FOUR MUNICIPALITIES
THE CONFIGURATIONAL APPROACH

Space Syntax analysis in the context of disaster is used to:
1. Highlight abrupt changes inflicted by the earthquake to the morphology of the urban system;
2. Quantify the dynamic changes in levels of movement flows, centrality and attractiveness in time;
3. Predict the effects of the housing emergency supply;
4. Evaluate the inner resilience of the spatial system.

Four Crater's Municipalities are chosen as case studies in view of their:
- Proximity to the epicentres
- Earthquakes' greater damage
- Highest number of S.A.E.



CASE STUDIES

1 Norcia (PG), Umbria
2 Amatrice (RI), Lazio
3 Accumoli (RI), Lazio
4 Arquata del Tronto (AP), Marche

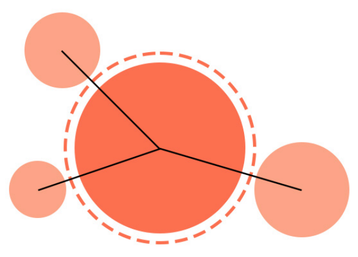
In the "Centrality" maps (i.e. Integration measure), the dark red lines correspond to a higher density of commercial activities and pedestrian presence.

The "Traffic flow" maps (i.e. Choice measure), on the other hand, describe where the movement concentrates or, similarly, where the paths overlap, as they measure the number of times a certain street (or part of it) falls into the shortest route connecting every origin to every destination.

"BIG" SYSTEMS

Cities as Norcia and Amatrice, with their well-defined grid structure, seem not to be perturbate by the addition of new elements, even if the actual size of the temporary camps is not so minimal: **the impact of the post-emergency settlements on the global system, in these cases, is minimum/non-existent**.

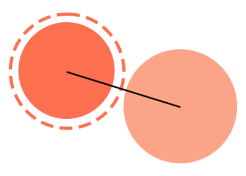
Once the reconstruction has been completed, the expectation is that the new settlements (in the hypothesis of missed disposal) could easily be included in the recovered urban system as new neighbourhoods (the closest to the centre ones) or as commercial hubs (the ones in the suburban areas).



SMALL SYSTEMS

Towns as Accumoli and Arquata del Tronto have small historical centres that have been completely destroyed by the 2016 earthquake.
In this scenario, **the emergency settlements are newly built centres, substitutes for historical ones**: the foreground network crosses the S.A.E. and the new streets are meant to acquire economic value and social desirability.

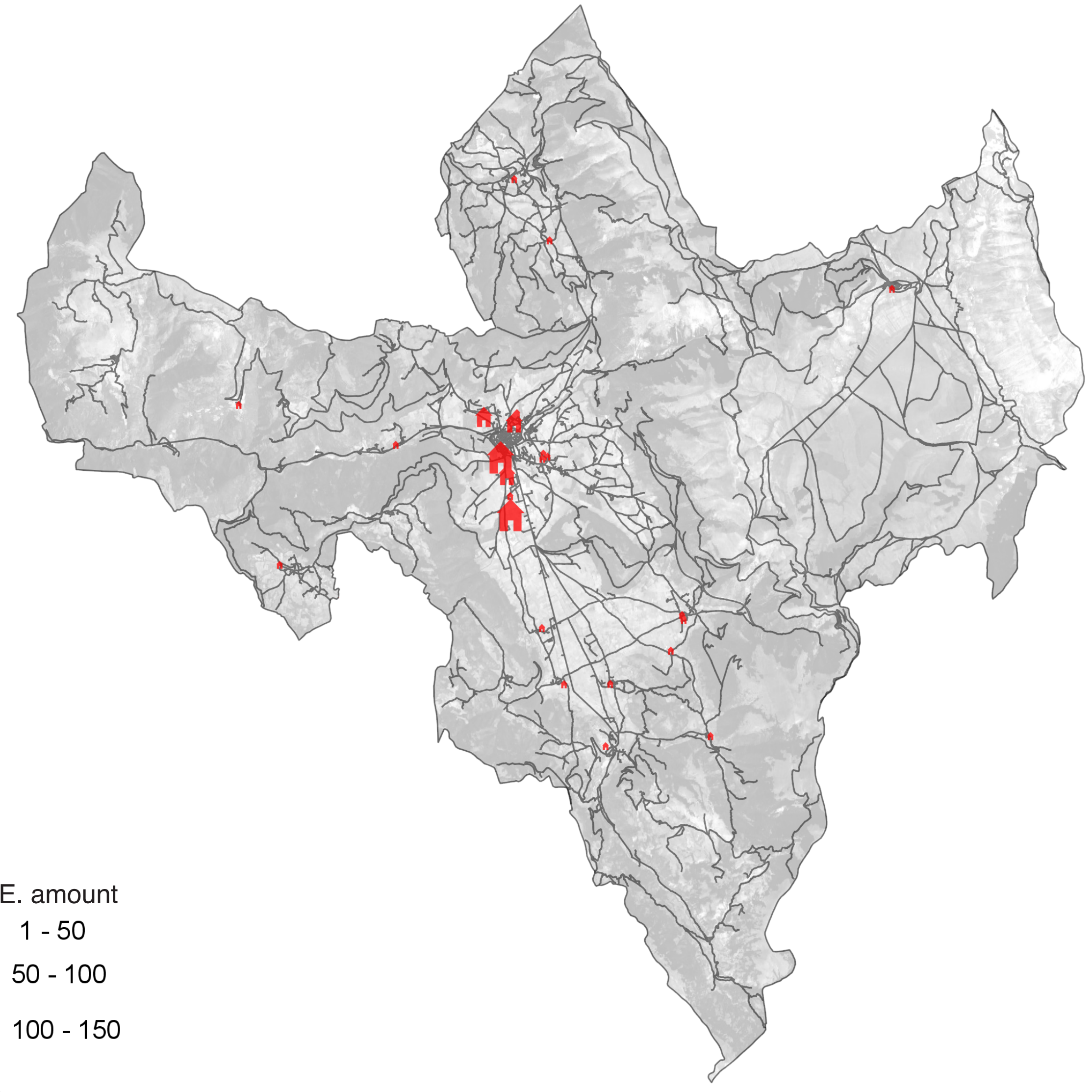
Once the reconstruction has been completed, the expectation is that the new settlements would compete with the recovered towns as duplicate centres, at least until their dismantling.



[The higher values of the presented indices have a positive meaning]

🟥 high
🟦 low

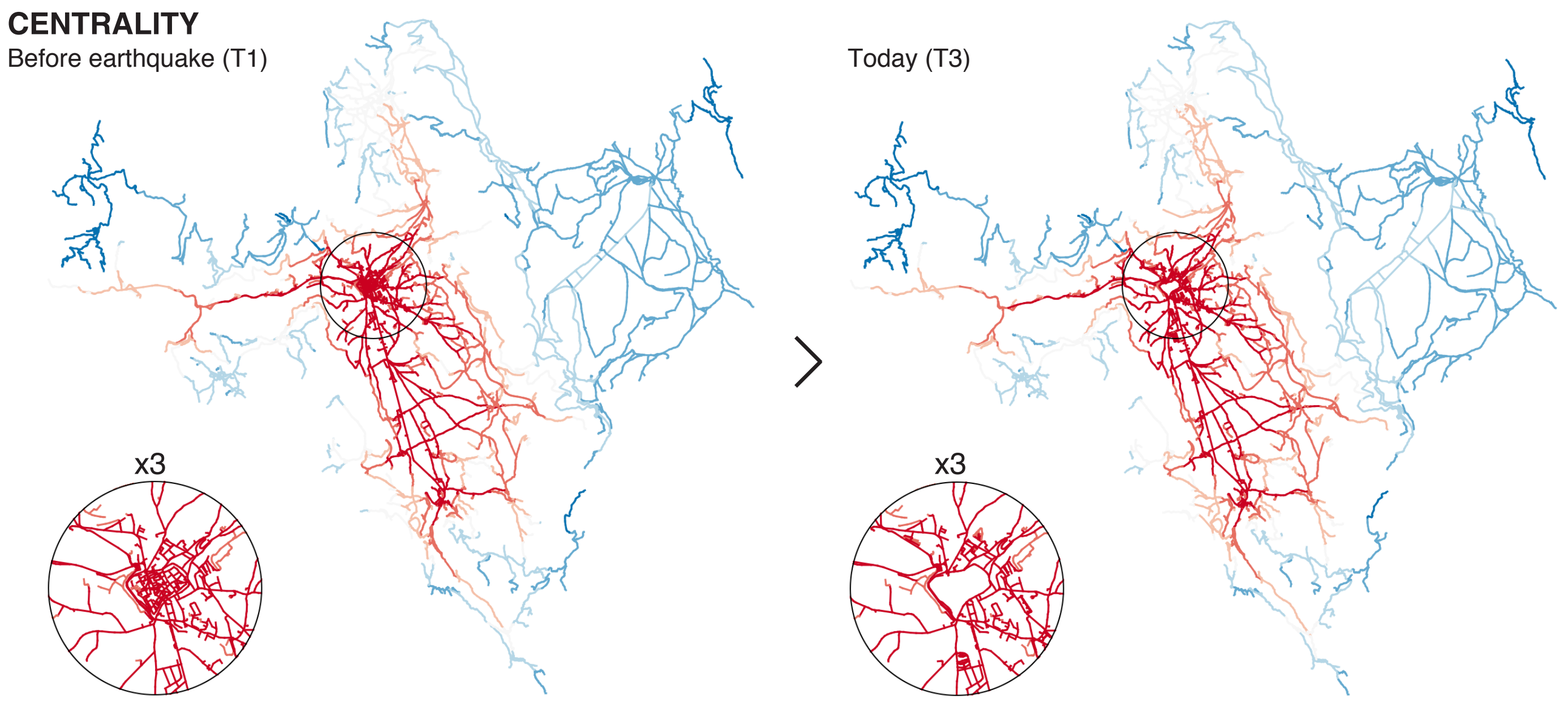
NORCIA
Population: 4,981 (2017)



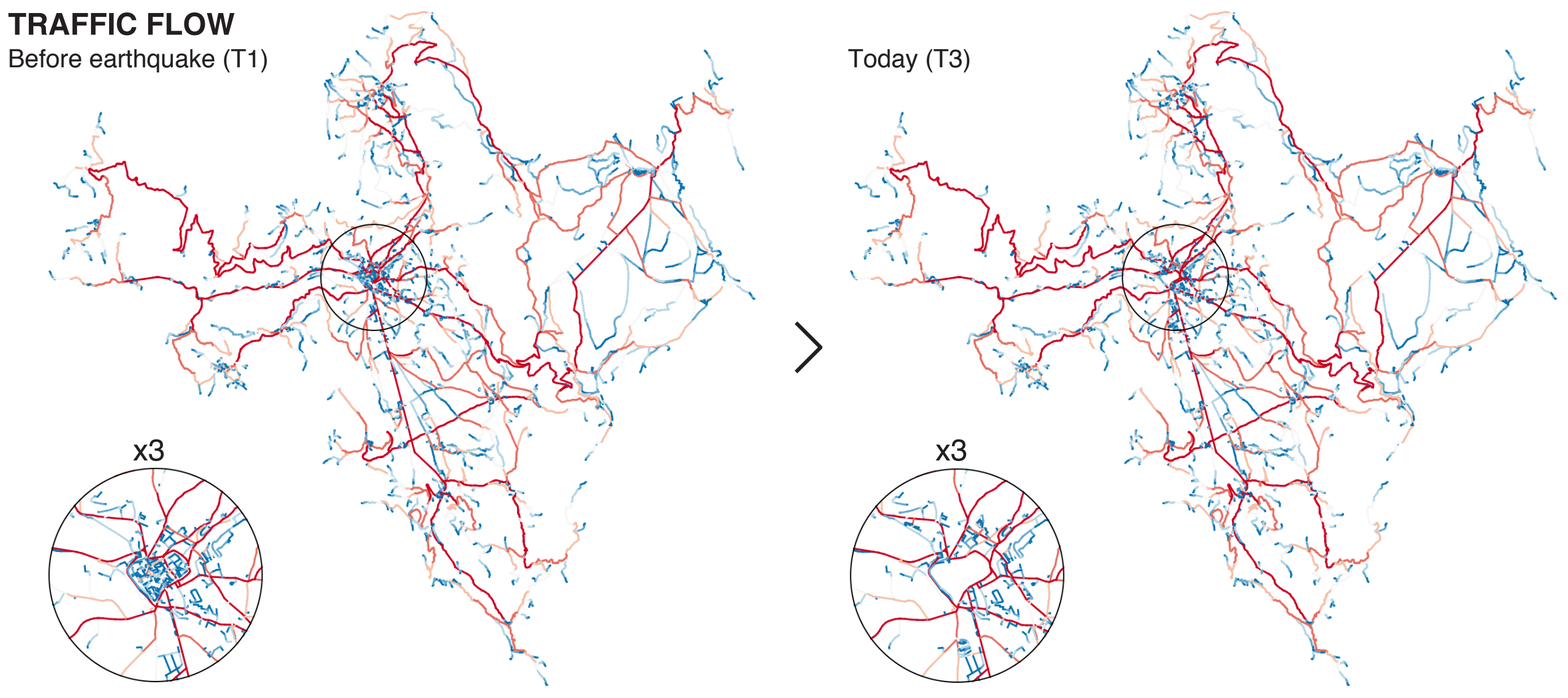
S.A.E. amount
1 - 50
50 - 100
100 - 150

5 km

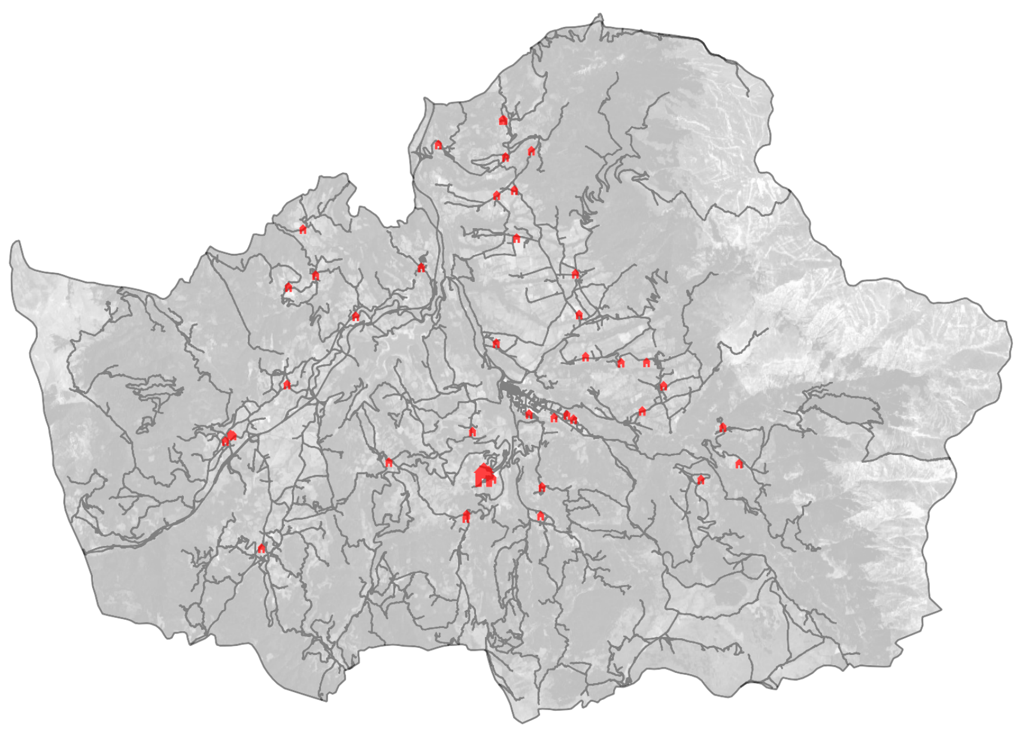
CENTRALITY
Before earthquake (T1)
Today (T3)



TRAFFIC FLOW
Before earthquake (T1)
Today (T3)



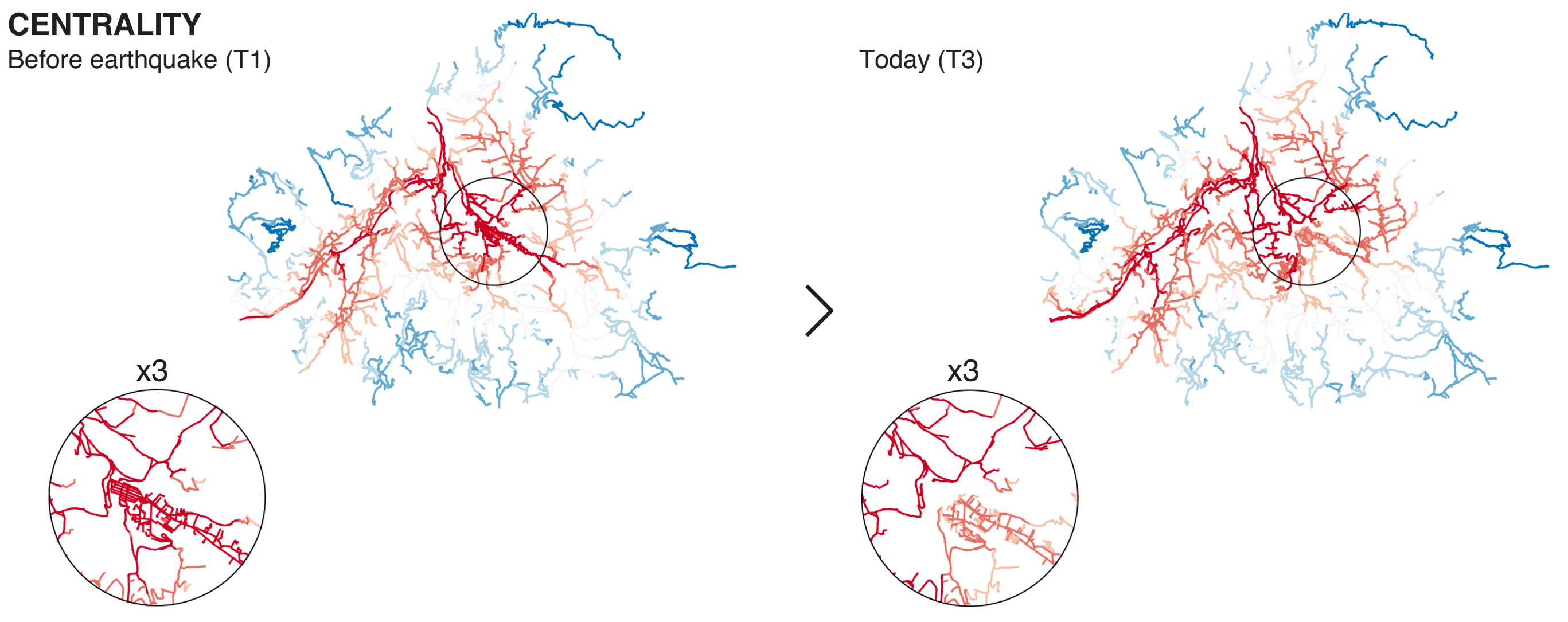
AMATRICE
Population: 2,495 (2018)



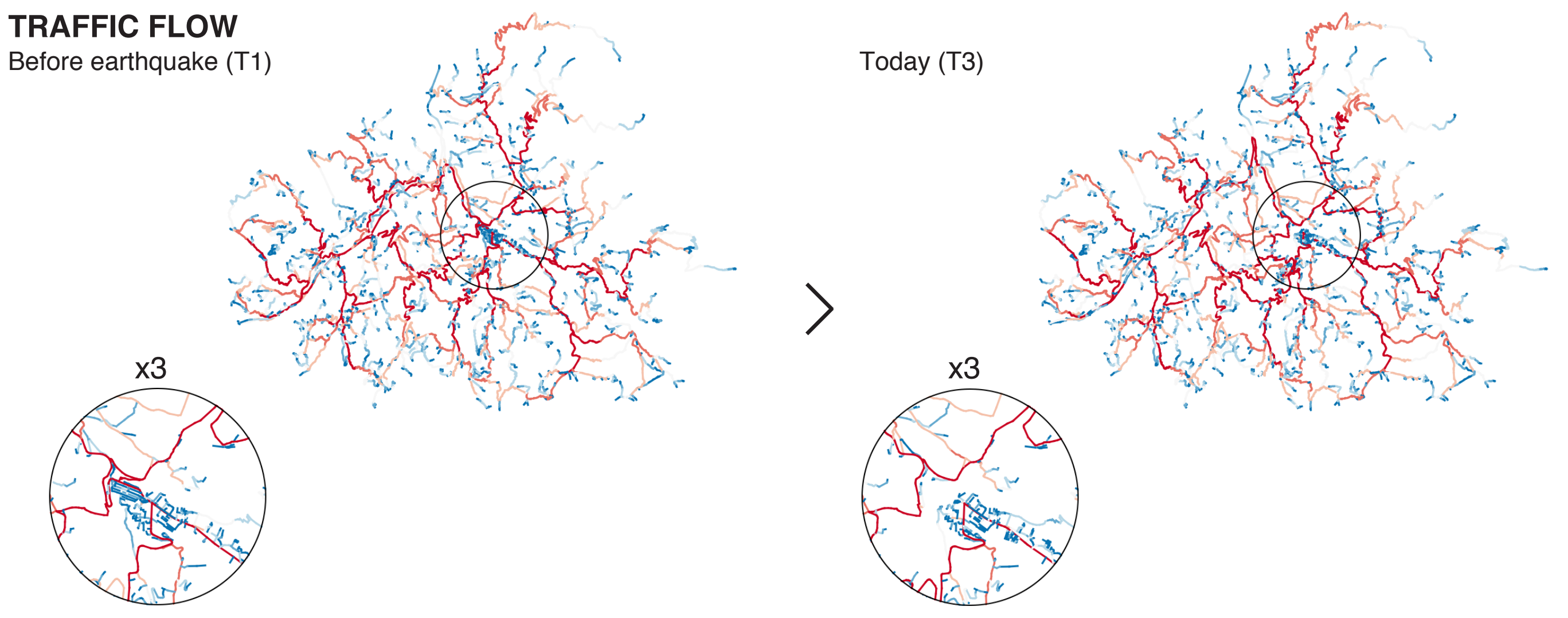
S.A.E. amount
1 - 50
50 - 100

5 km

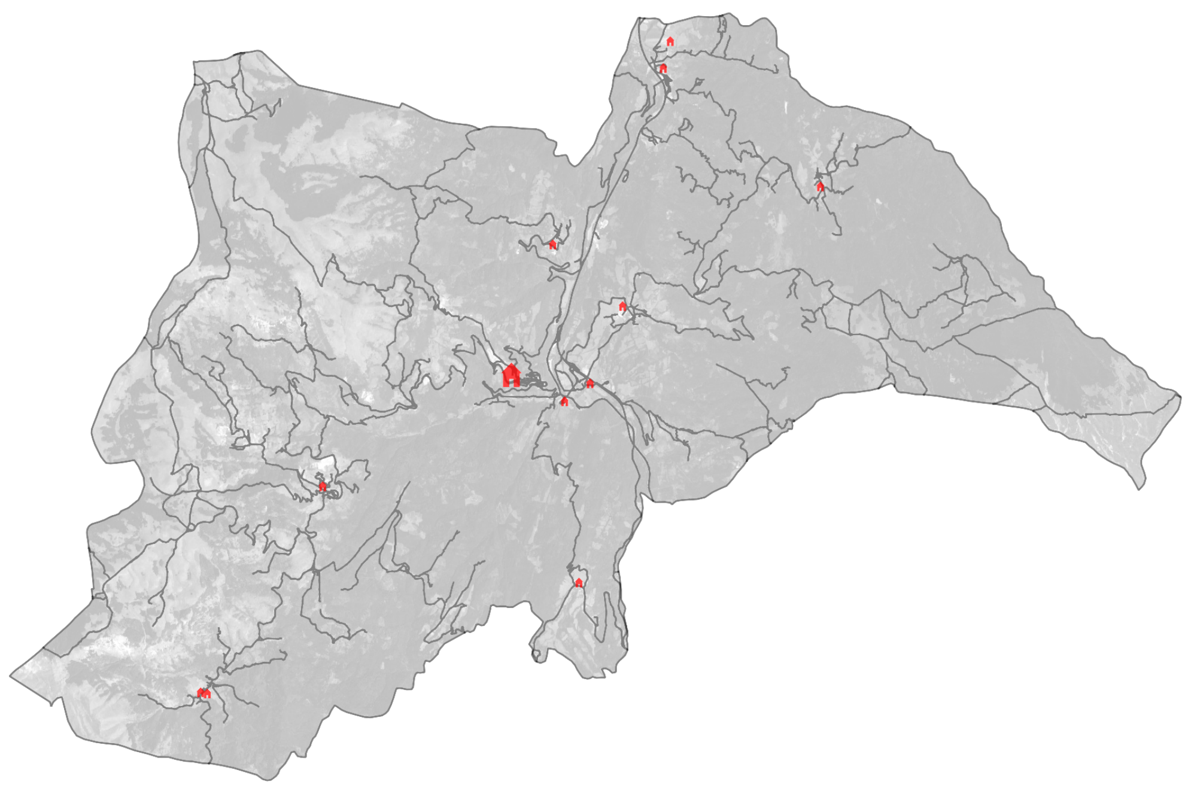
CENTRALITY
Before earthquake (T1)
Today (T3)



TRAFFIC FLOW
Before earthquake (T1)
Today (T3)



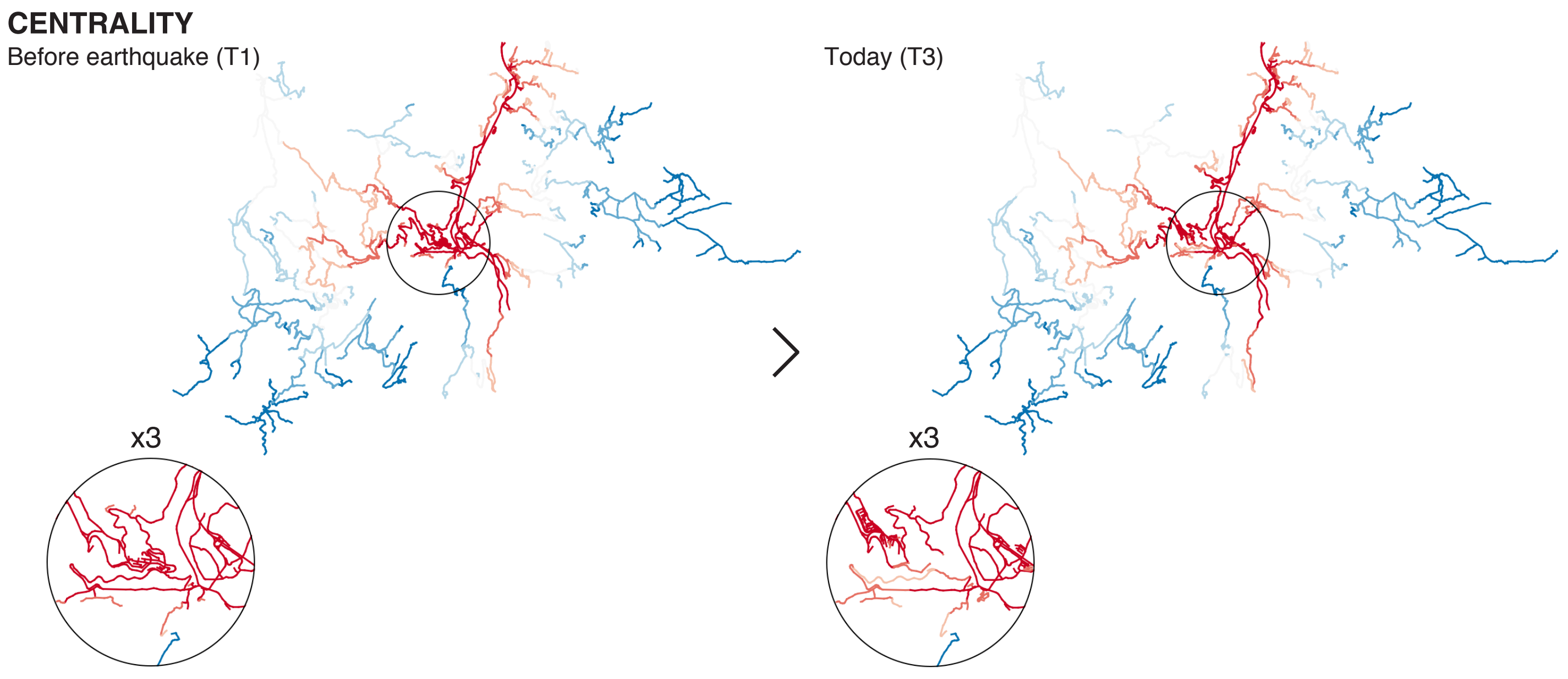
ACCUMOLI
Population: 647 (2017)



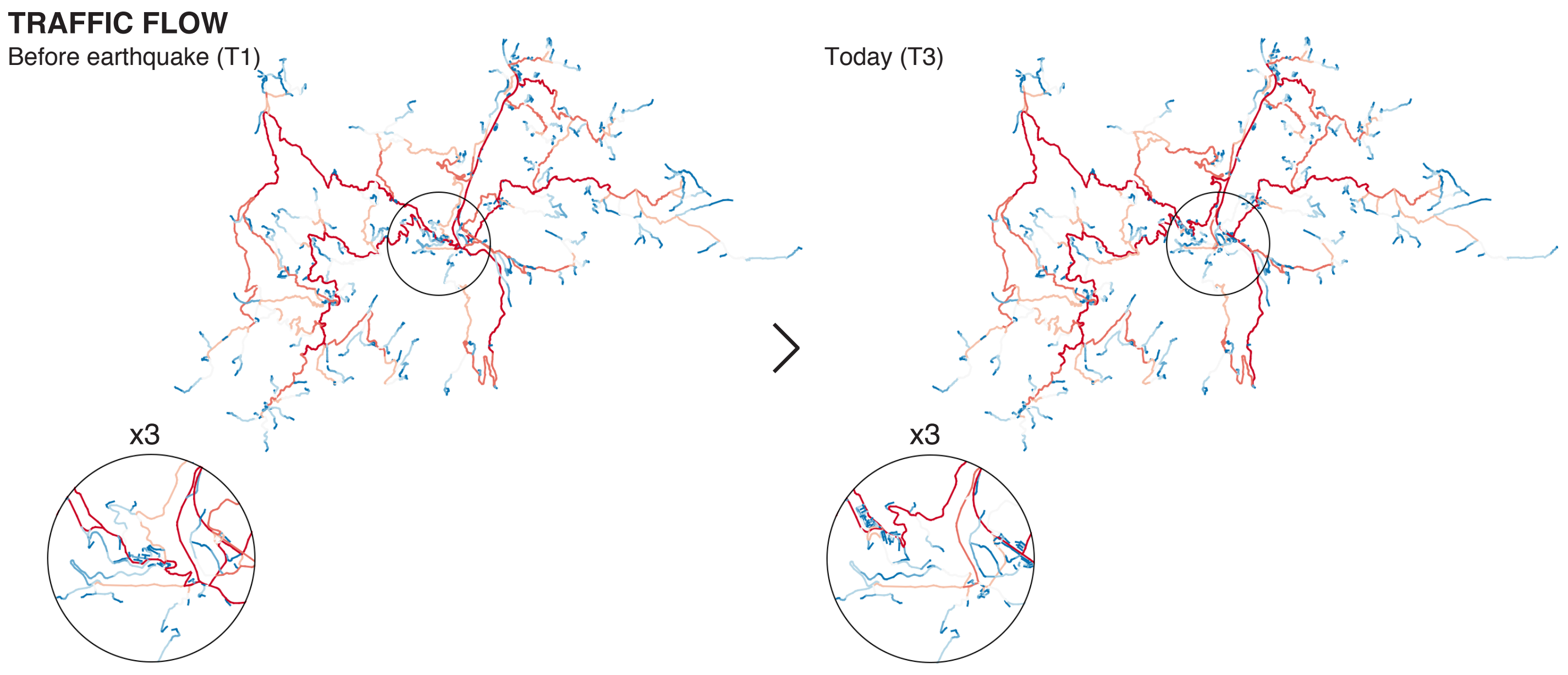
S.A.E. amount
1 - 50
50 - 100

5 km

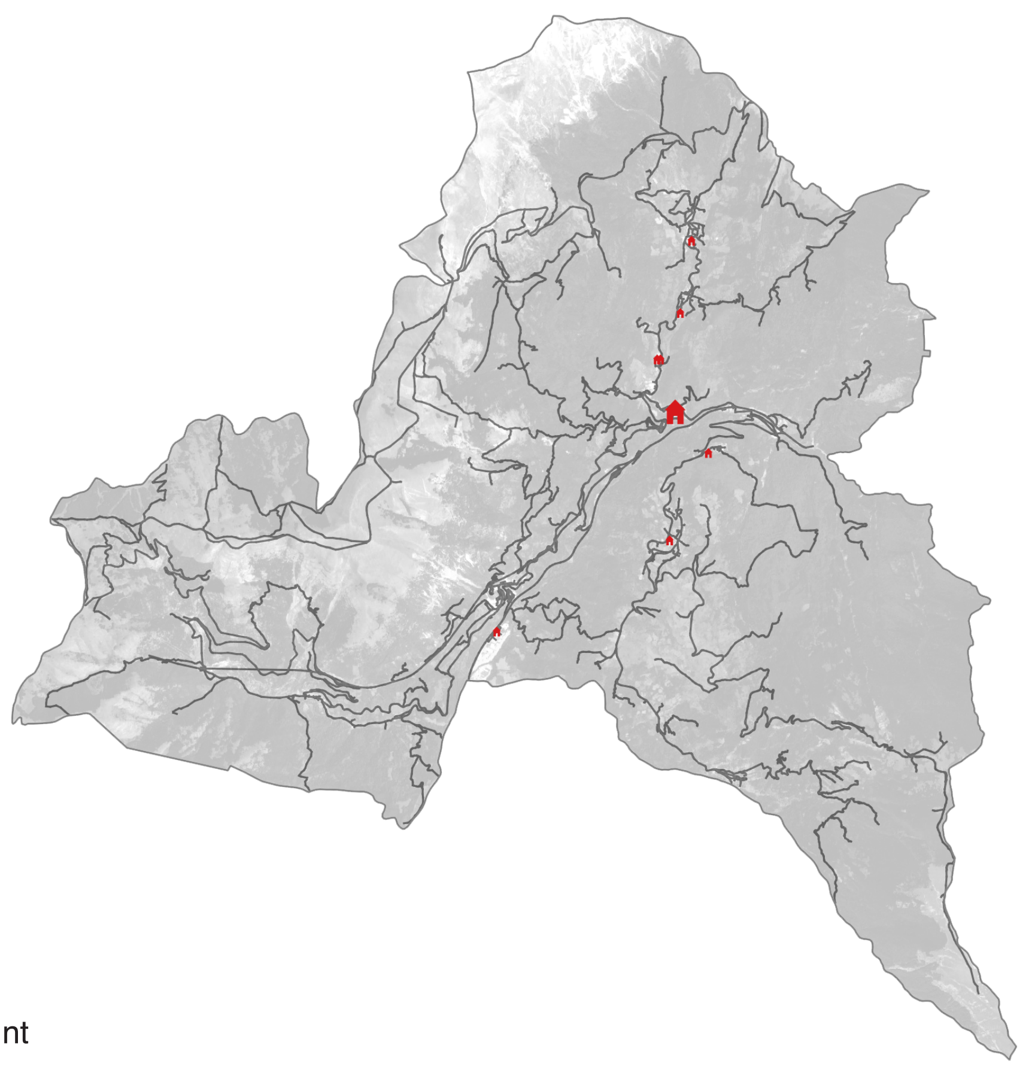
CENTRALITY
Before earthquake (T1)
Today (T3)



TRAFFIC FLOW
Before earthquake (T1)
Today (T3)



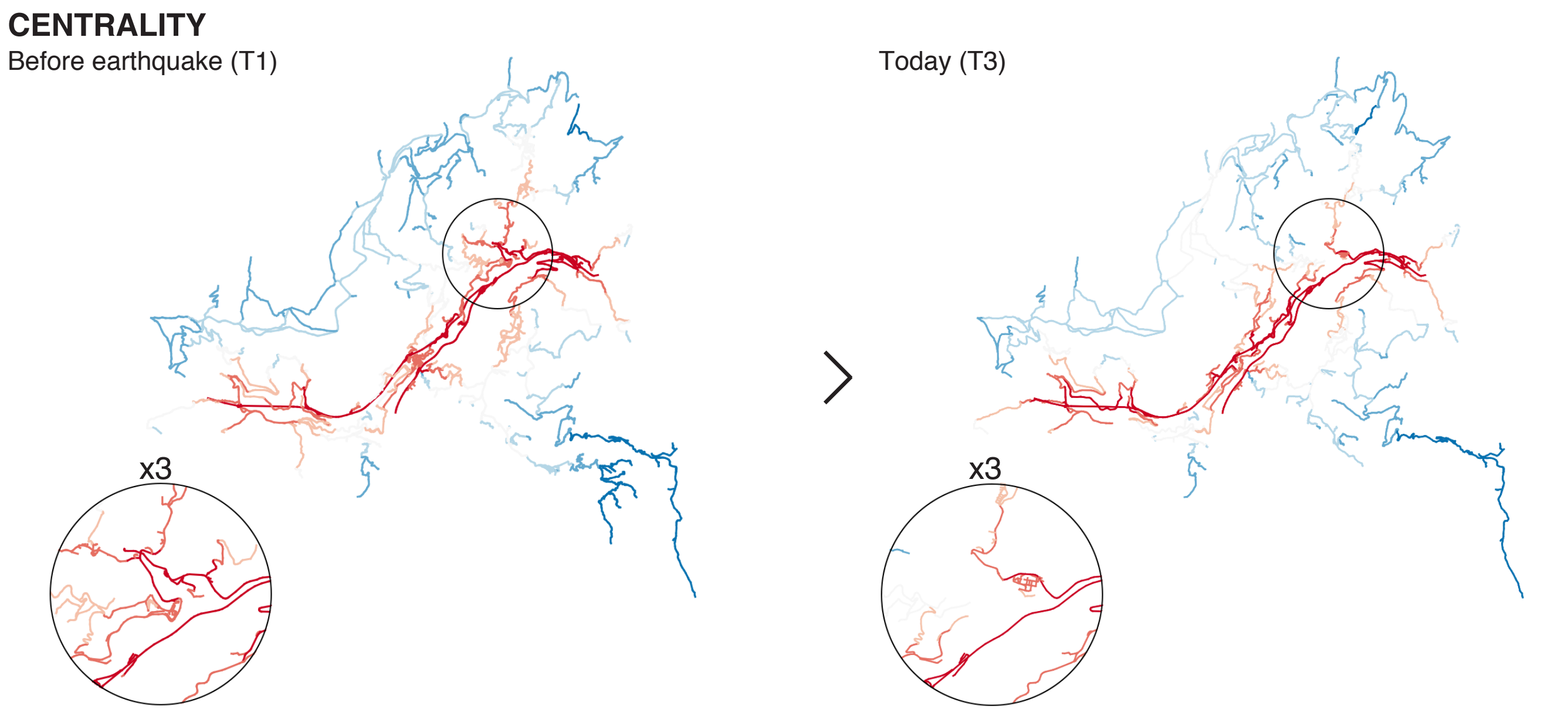
ARQUATA DEL TRONTO
Population: 1,141 (2017)



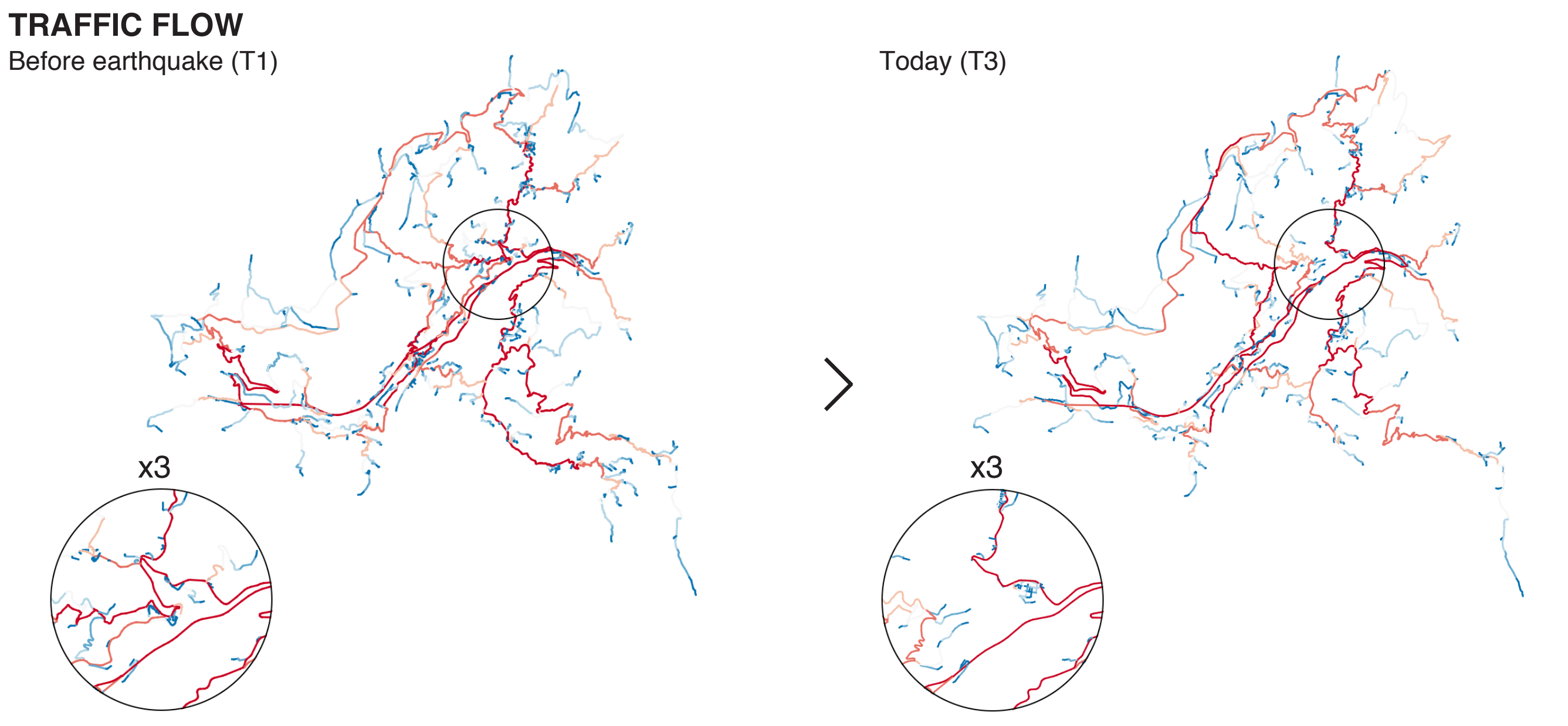
S.A.E. amount
1 - 50
50 - 100

5 km

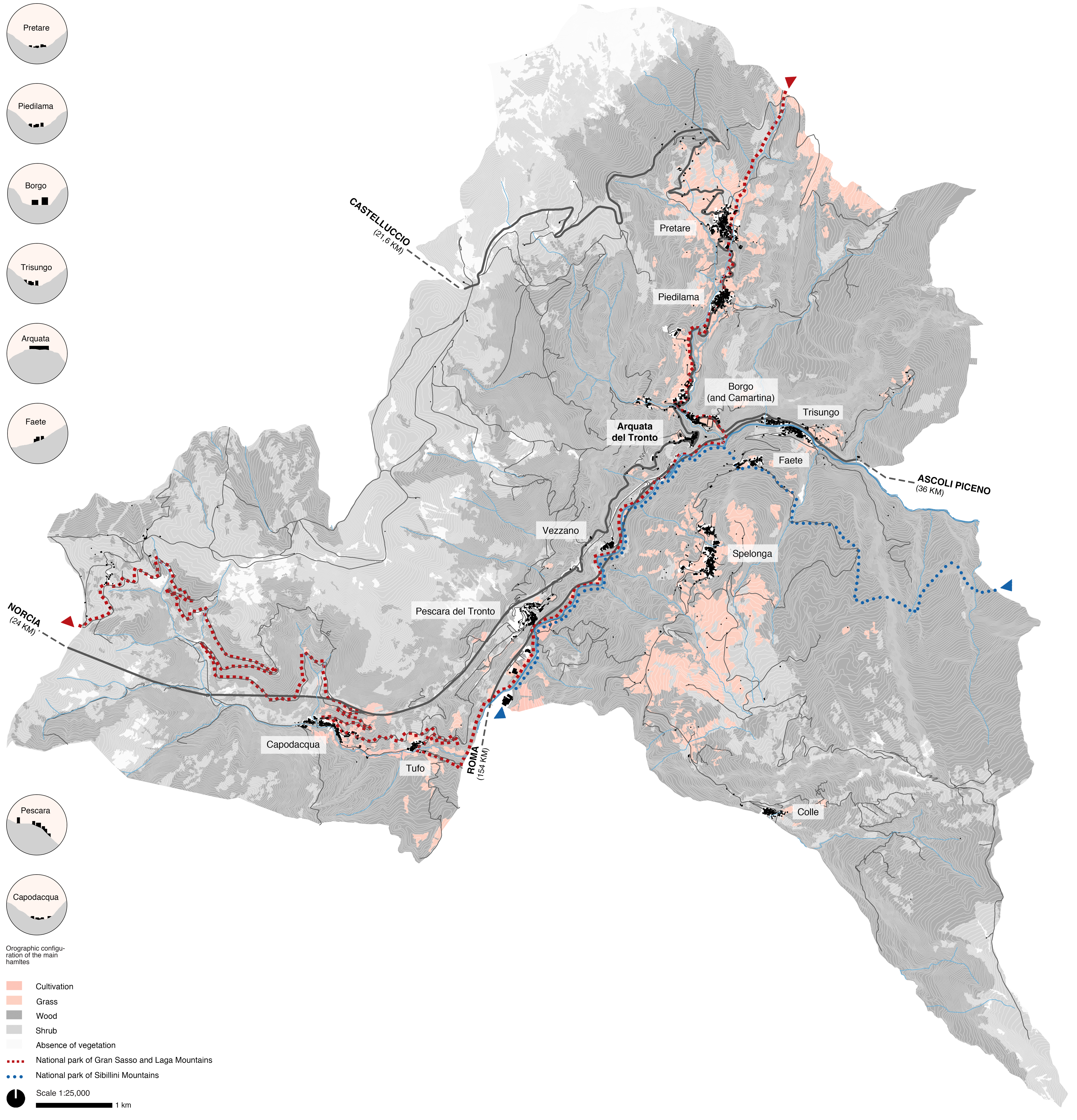
CENTRALITY
Before earthquake (T1)
Today (T3)



TRAFFIC FLOW
Before earthquake (T1)
Today (T3)



ARQUATA DEL TRONTO MUNICIPALITY
PRE-EARTHQUAKE PHASE



Orographic configuration of the main hamlets

- 🟥 Cultivation
- 🟥 Grass
- ▨ Wood
- ▨ Shrub
- ☐ Absence of vegetation
- ■■■■ National park of Gran Sasso and Laga Mountains
- ● ● ● National park of Sibillini Mountains

Scale 1:25,000

1 km

TERRITORY

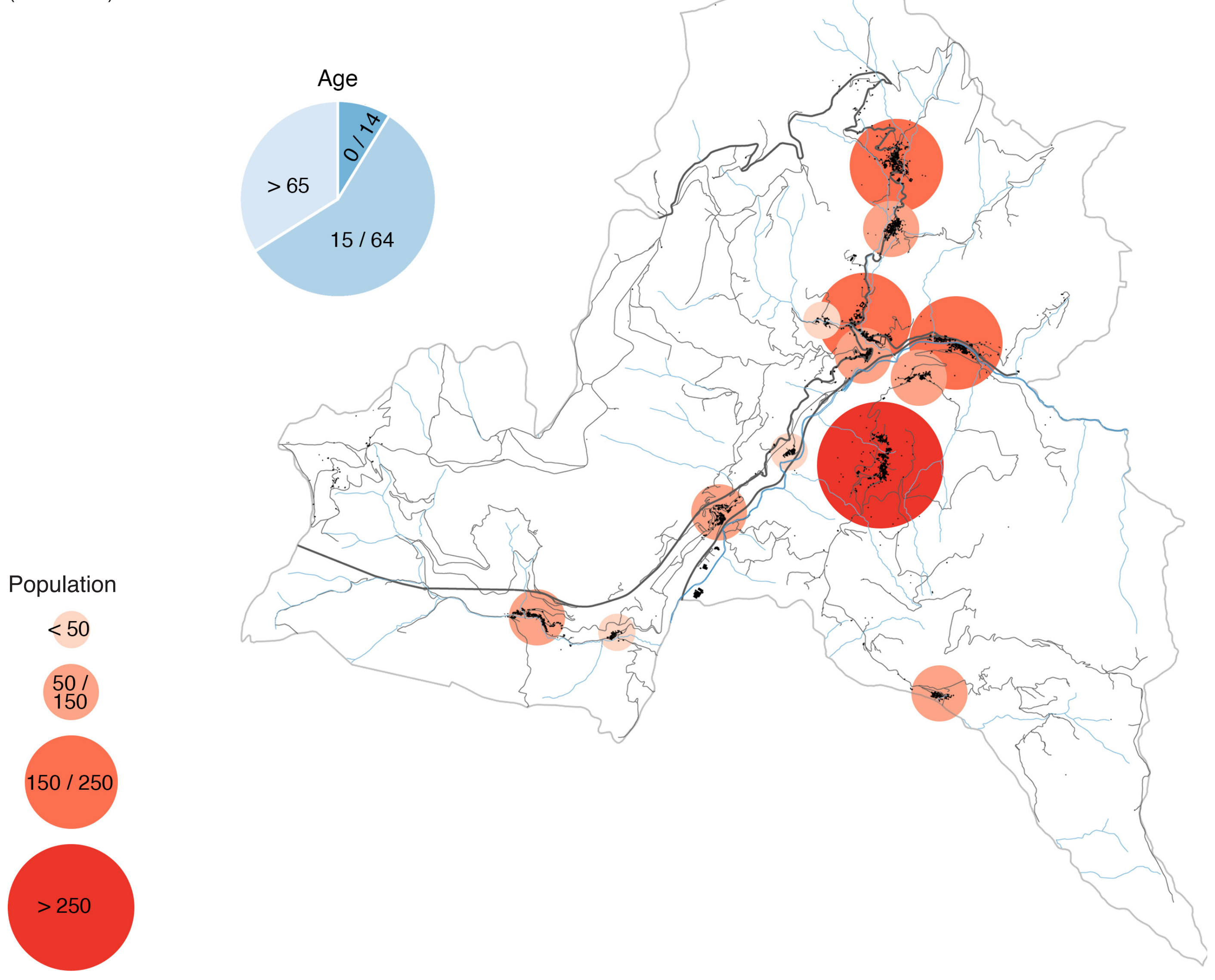
The Municipality of Arquata del Tronto, in the Province of Ascoli Piceno, is in the southern part of the Marche Region. It is the only Municipality in Europe included in two National Parks, the Sibillini Mountains and the Gran Sasso-Laga Mountains: two important macro-areas of landscape, very distinct and recognizable by morphology, territorial relations and identification process of the population to the places.
The Arquata's territory, predominantly mountainous, is crossed by the Tronto river, which divides the two mountain slopes into a front visual relationship, in which the maximum altitude is reached by the top of Mount Vettore (2,476 m a.s.l.), one of the highest peaks of the Apennine mountain range.
Since the Roman age, the territory has gained importance for the passage of the Via Salaria, parallel to the Tronto river, and for its strategic position, also as a frontier between the Kingdom of Naples and the Papal State.

HISTORICAL CENTRES

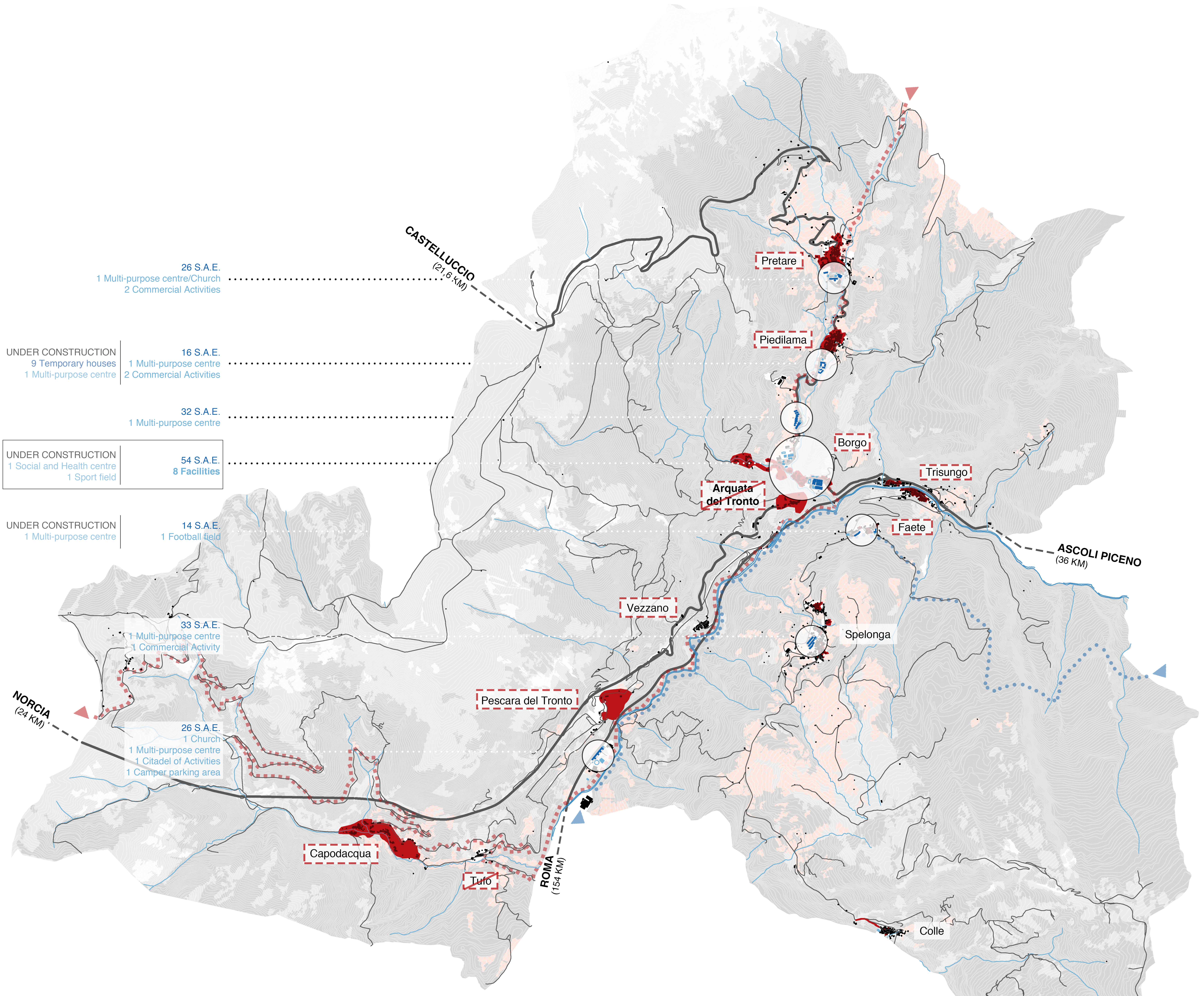
The territory of Arquata, whit its 14 hamlets, on one hand shows a strong presence of man in relation to the Tronto river and to the infrastructural system of the Via Salaria, on the other reflects the harshness of the landscape, which, before the earthquake, appeared still predominantly unchanged.
The physiognomy of the area in fact, due to its geographical isolation and to the conformation of the territory, has resisted the heavy transformations linked to the production processes of the economic boom years. This had allowed the conservation of the environmental heritage and of the historical settlement systems but has determined a poor development.
Nonetheless, the natural sensitivity of the population and the tourist vocation already intrinsic in the territory and in the urban structure of the towns, were the starting point of a new reality of social and economic growth.

View of Arquata del Tronto hamlet (Cimaroli, 2009)

DEMOGRAPHY
(Istat 2011)

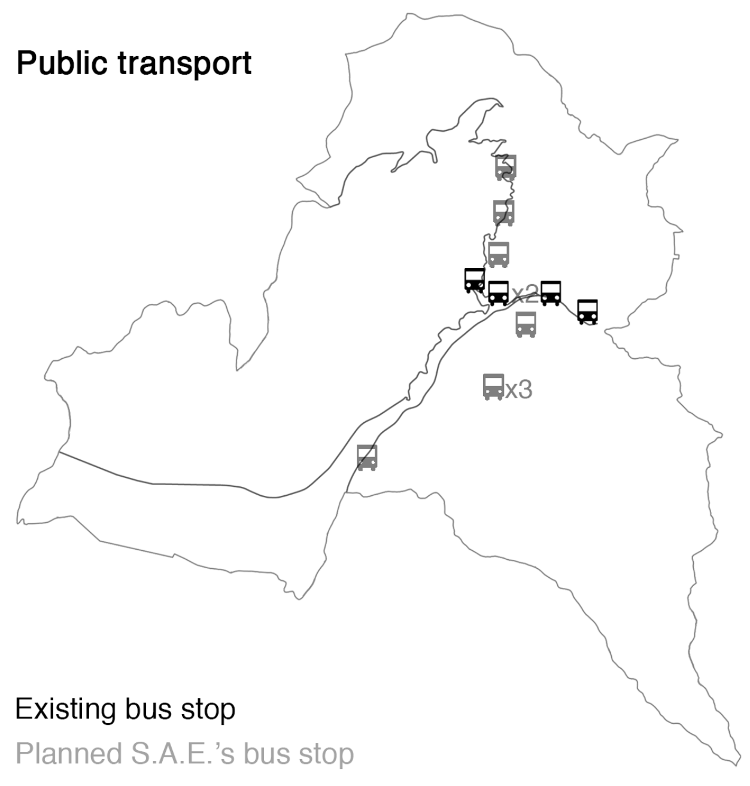


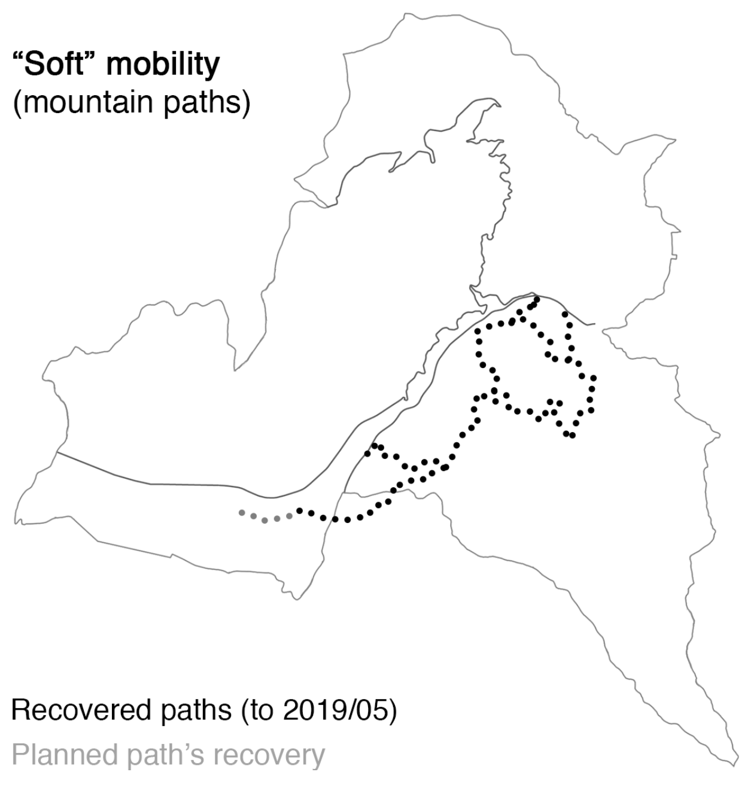
ARQUATA DEL TRONTO MUNICIPALITY
POST-EARTHQUAKE PHASE

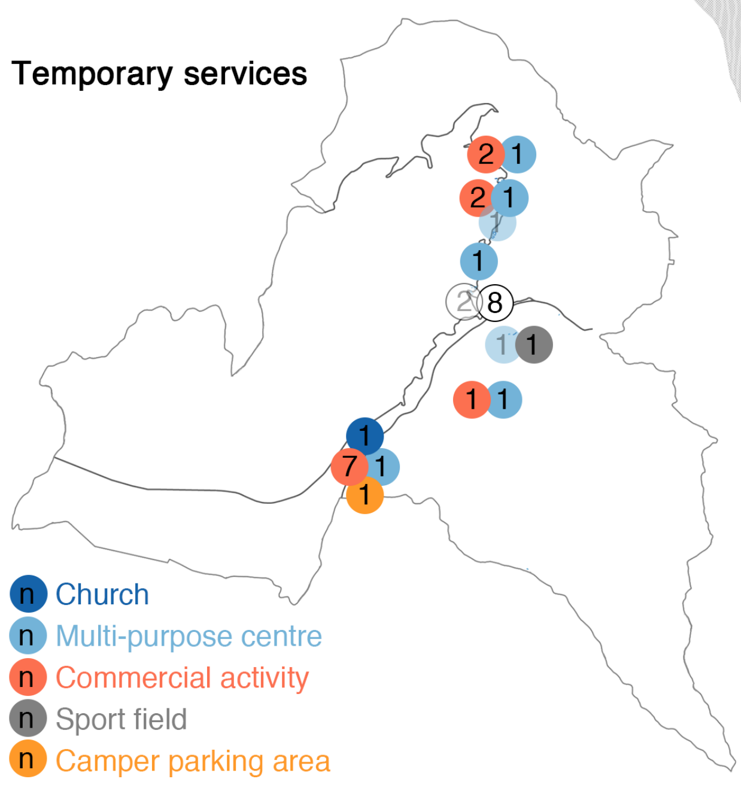


- Temporary settlement
- 🟥 Red zone (Off limits)
- Condemned buildings > 90%
- Condemned buildings = 100%
- Cultivation
- Grass
- Wood
- Shrub
- Absence of vegetation
- ▪▪▪▪ National park of Gran Sasso and Laga Mountains
- ••• National park of Sibillini Mountains

Scale 1:25,000
1 km


Public transport
Existing bus stop
Planned S.A.E.'s bus stop


"Soft" mobility
(mountain paths)
Recovered paths (to 2019/05)
Planned path's recovery


Temporary services
- n Church
- n Multi-purpose centre
- n Commercial activity
- n Sport field
- n Camper parking area

EMERGENCY MANAGEMENT

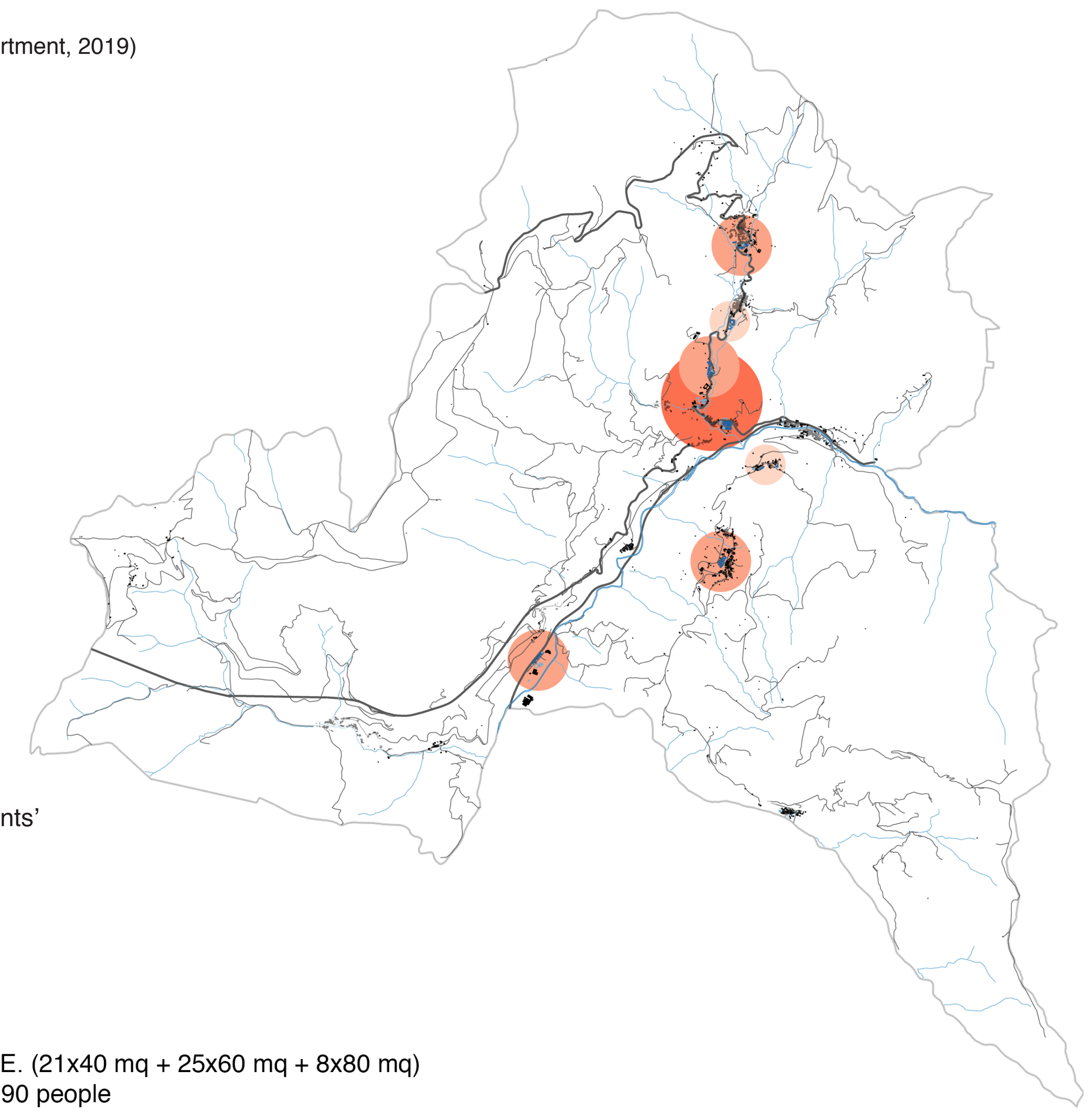
The earthquake severely hit the Municipality area, making more than half of the buildings of its hamlets unusable: Colle was the least affected, with 67% of uninhabitable buildings, while the most disastrous were Camartina, Tufo and the capital Arquata with 100% of buildings declared uninhabitable.
Under these conditions, 7 temporary emergency settlements were set up near the most populous hamlets: started in January 2017 and delivered to the Mayor by December of the same year, about 200 S.A.E. house 600 people for a total of 30 million euros spent (including urbanization, supply, transport and assembly of housing solutions).
Simultaneously with the management of the housing emergency, thanks to the generous donations of private individuals, a series of temporary structures were set up to house a school, shops (15), multi-purpose centres (6 + 2 currently under construction), places of worship (2), sports fields (2) and administrative offices (entirely built in the hamlet of Borgo, at the foot of the destroyed capital).

MOBILITY

In order to mitigate the impact of seismic events on the population involved, to maintain the identity of the territory and to rebuild the economic-social fabric (also promoting slow tourism), some actions were undertaken by both public bodies and private associations.
Regarding the local public transport, the Marche Region in June 2019 launched a loan for the construction of new bus stopping facilities necessary to serve the S.A.E. areas.
Concerning the so-called "soft" mobility, since 2016 the Arquata Potest Association, funded by the Central Italy Earthquake Committee, is recovering the ancient paths that have been for centuries the only communication routes, linking all the hamlets of the Municipality. Along these routes, paving stones and dry-stone walls ("World Heritage" according to UNESCO) are still visible and allow to discover authentic architectural jewels hidden in the vegetation.

View of Arquata del Tronto hamlet (skytg24, 2016)

DEMOGRAPHY
(Civil Protection Department, 2019)



Temporary settlements' population
- < 50
- 50 / 150
- 150 / 250

Borgo
54 S.A.E. (21x40 mq + 25x60 mq + 8x80 mq)
about 190 people

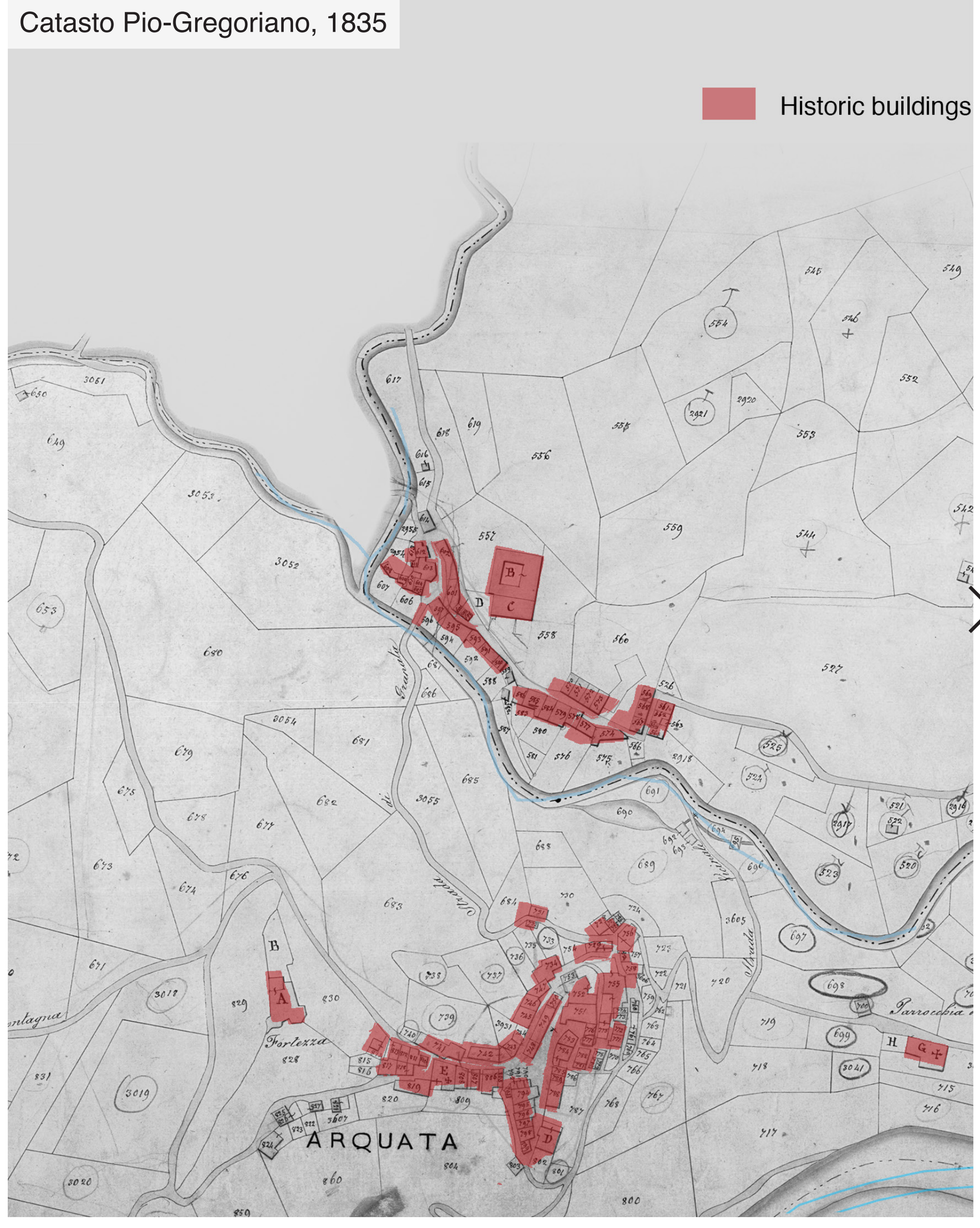
BORGO DI ARQUATA
STATE-OF-THE-ART

BUILT HERITAGE

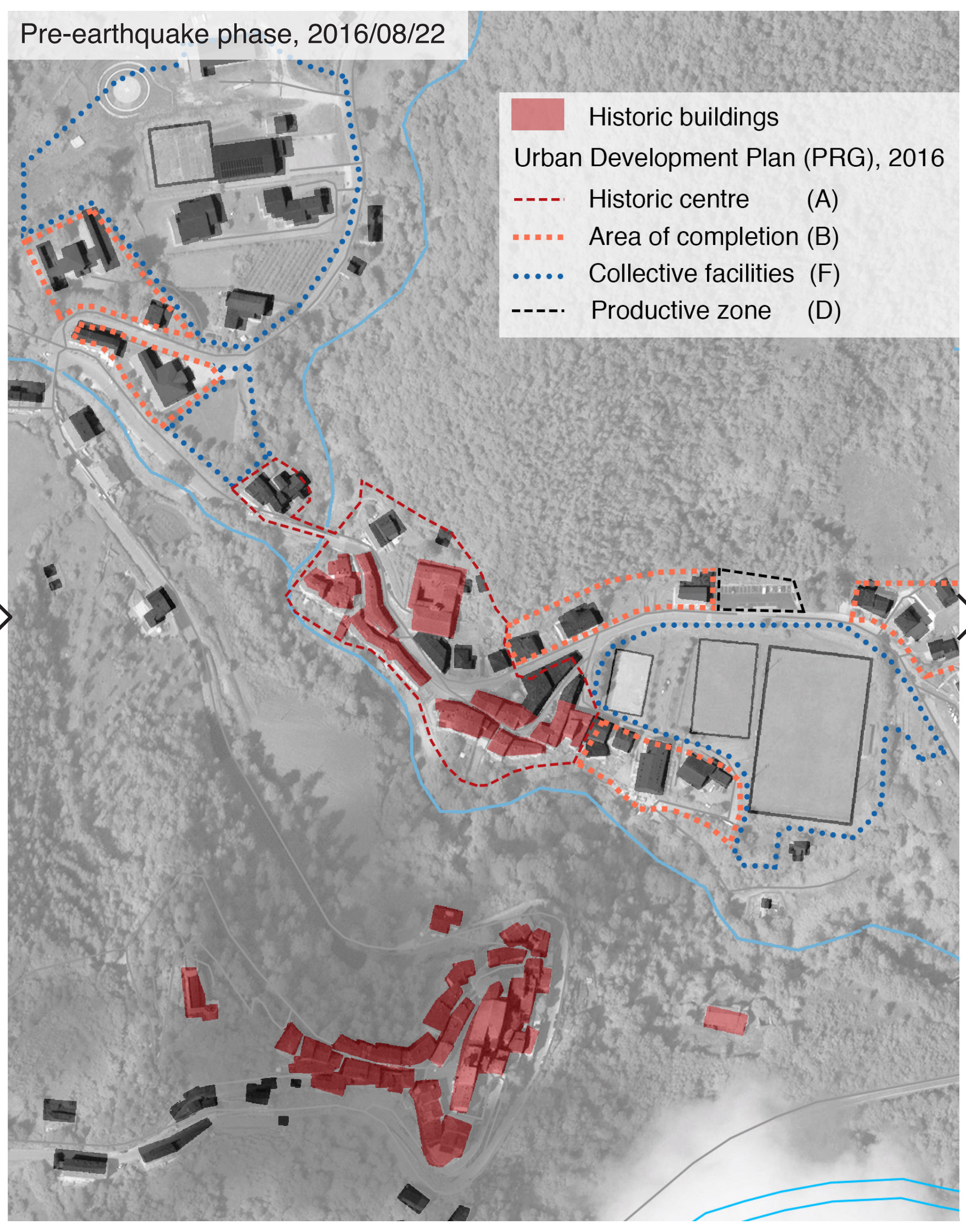
The hamlet of Borgo rises along the southern slope of Mount Vettore, along the Provincial Road 89 Valfluvione, about 1.5 km from the capital Arquata.
As can be seen from the consultation of the Catasto Pio-Gregoriano, the village presented a settlement core as early as 1835 which developed around the Church of San Francesco; this is part of the goods listed in the Archives of the Ministry of Cultural Heritage and Activities and Tourism, together with the Church of S.S. Pietro and Paolo.
The 64 buildings that form the hamlet (today 90% unusable) are mainly in stone masonry and often characterized by sack masonry systems. There are few buildings with a reinforced concrete frame structure, but many with reinforced concrete roofs, built following extraordinary maintenance, even if many units have kept the wooden covers. In some buildings it is possible to identify some wooden overhangs and balconies.

URBAN PLANNING: pre and post-earthquake phases

Immediately after the shock of 24 August, a tent city was set up in the stadium area and precast structures were prepared for the administrative offices (Town Hall, Post Office, Civil Protection Office, Military base) in the adjacent service station. Following the much more destructive shock of 30 October, the tent city was gradually replaced by the S.A.E. village, while the administrative offices were transferred to the temporary structures built in the large area along the Provincial Road Valfluvione.
The construction of the aforementioned structures has led to the variation of the Urban Development Plan (PRG) so that it was adequate to the contingent reality: the area of the former sports fields is now classified as an area of Civil Protection, while the areas destined to collective equipment, even before the earthquake, were enlarged in the direction of the Church of the S.S. Pietro and Paolo, in whose vicinity a multi-purpose center with B&B was built.


Catasto Pio-Gregoriano, 1835

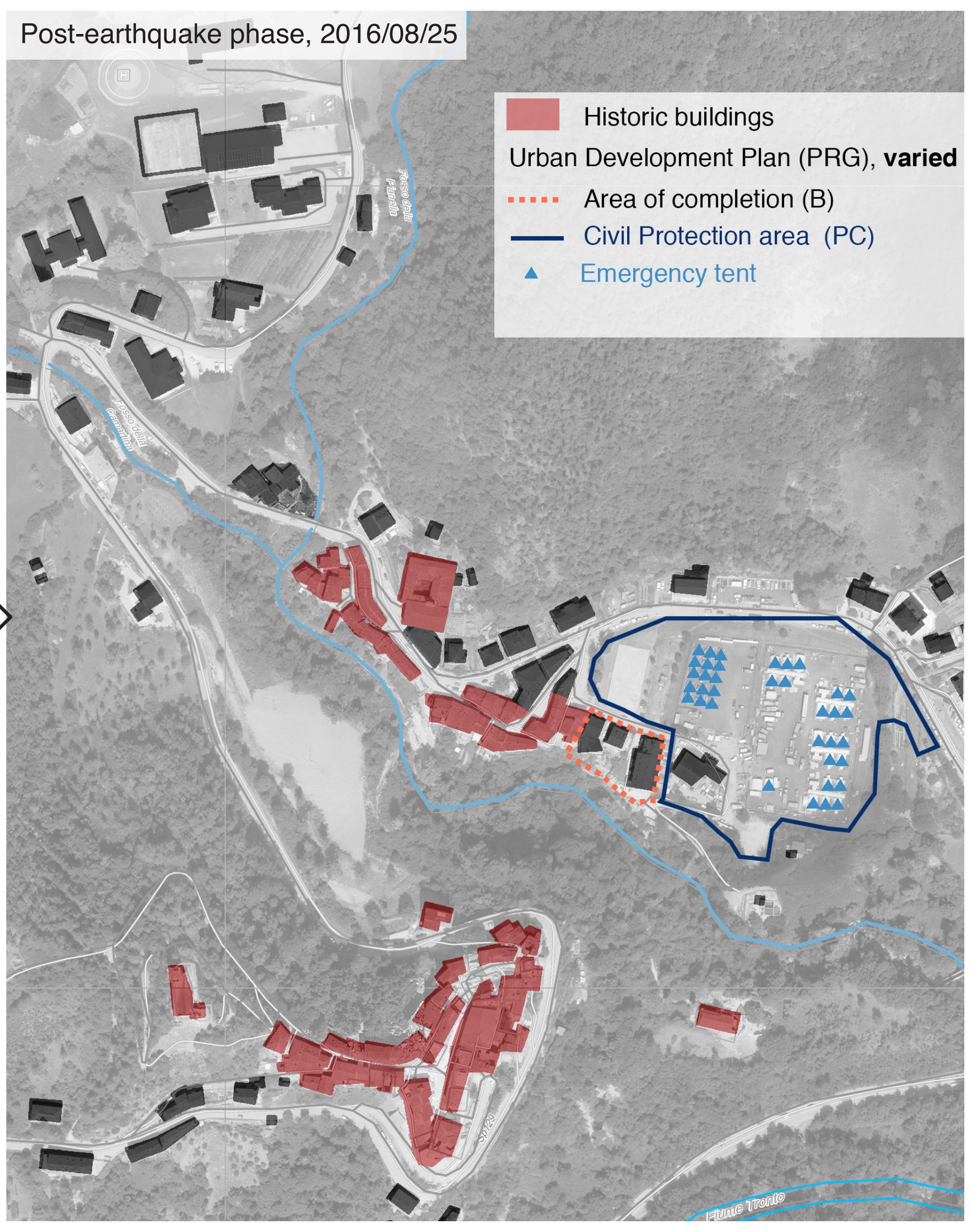
🟥 Historic buildings


Pre-earthquake phase, 2016/08/22

🟥 Historic buildings

Urban Development Plan (PRG), 2016

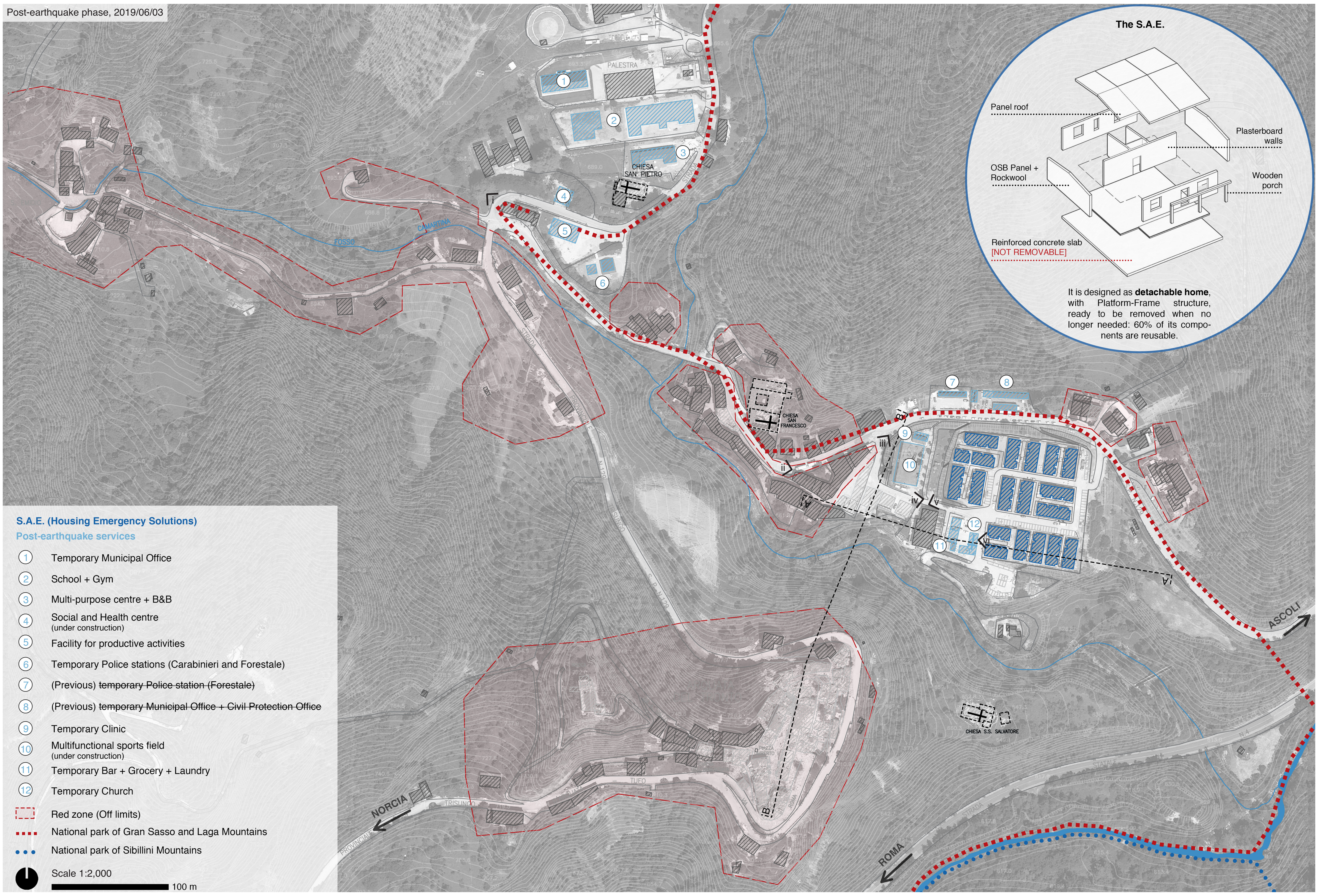
- Historic centre (A)
- Area of completion (B)
- Collective facilities (F)
- Productive zone (D)


Post-earthquake phase, 2016/08/25

🟥 Historic buildings

Urban Development Plan (PRG), **varied**

- Area of completion (B)
- Civil Protection area (PC)
- ▲ Emergency tent


Post-earthquake phase, 2019/06/03

The S.A.E.

It is designed as **detachable home**, with Platform-Frame structure, ready to be removed when no longer needed: 60% of its components are reusable.

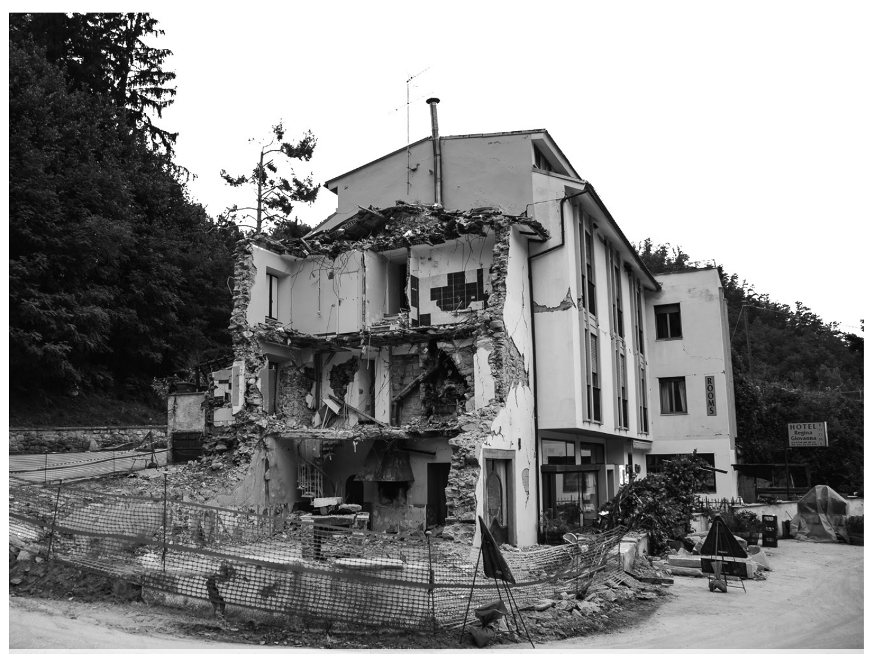
S.A.E. (Housing Emergency Solutions)

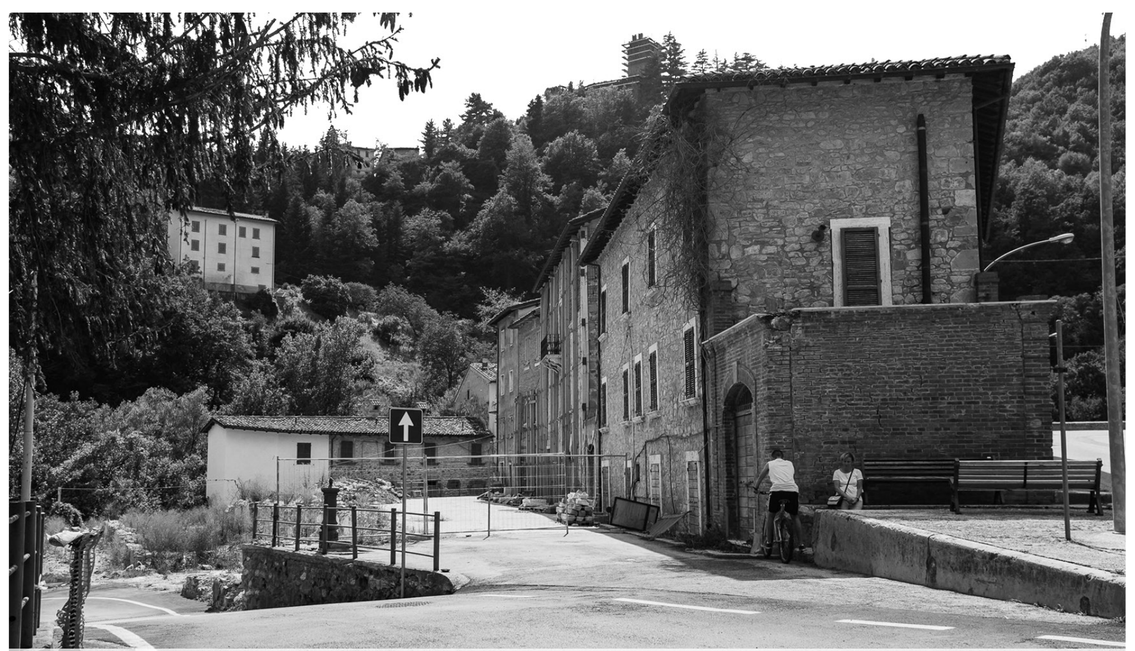
Post-earthquake services

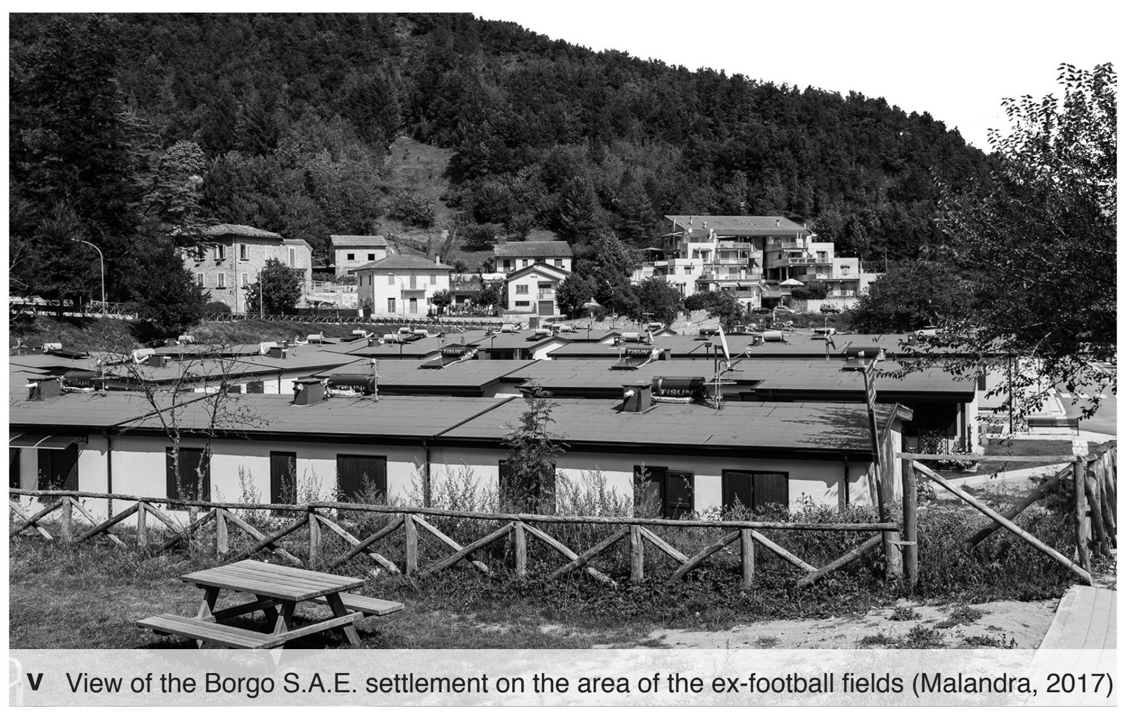
①	Temporary Municipal Office
②	School + Gym
③	Multi-purpose centre + B&B
④	Social and Health centre (under construction)
⑤	Facility for productive activities
⑥	Temporary Police stations (Carabinieri and Forestale)
⑦	(Previous) ~~temporary Police station (Forestale)~~
⑧	(Previous) ~~temporary Municipal Office + Civil Protection Office~~
⑨	Temporary Clinic
⑩	Multifunctional sports field (under construction)
⑪	Temporary Bar + Grocery + Laundry
⑫	Temporary Church
▭	Red zone (Off limits)
■ ■ ■	National park of Gran Sasso and Laga Mountains
● ● ●	National park of Sibillini Mountains

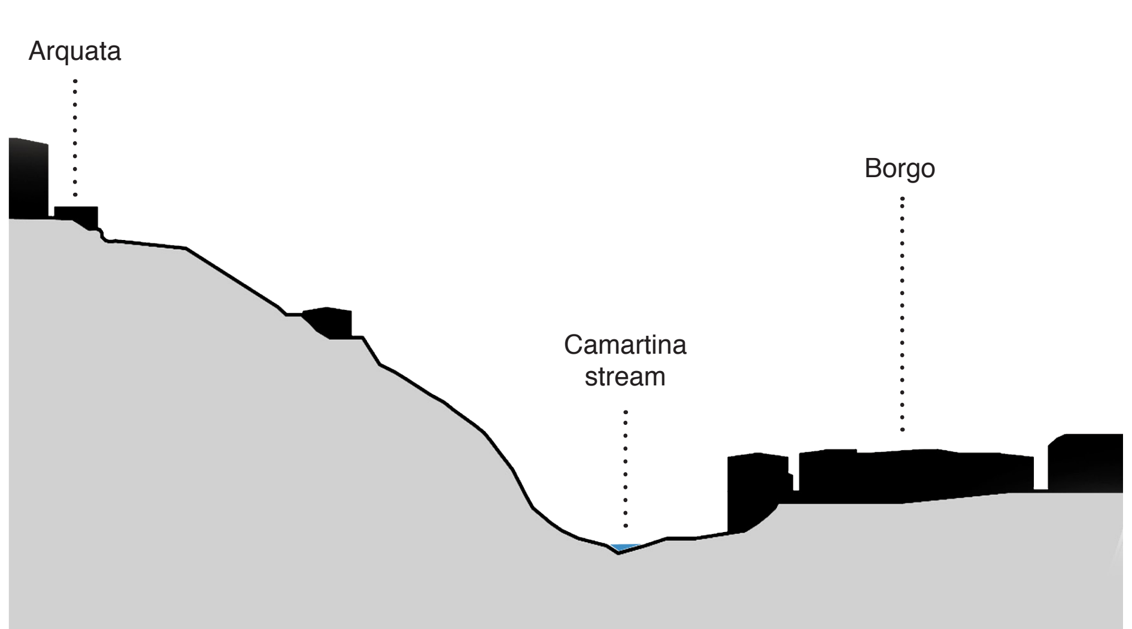
Scale 1:2,000

100 m

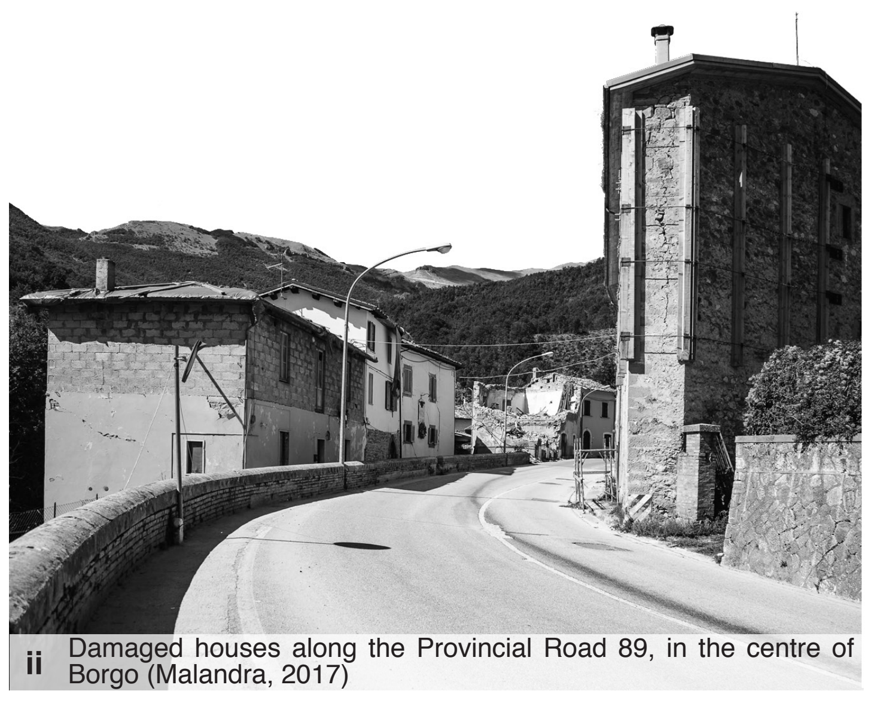

i The destroyed hotel / restaurant, at the intersection between the Provincial Roads 89 and 129 (Malandra, 2017)

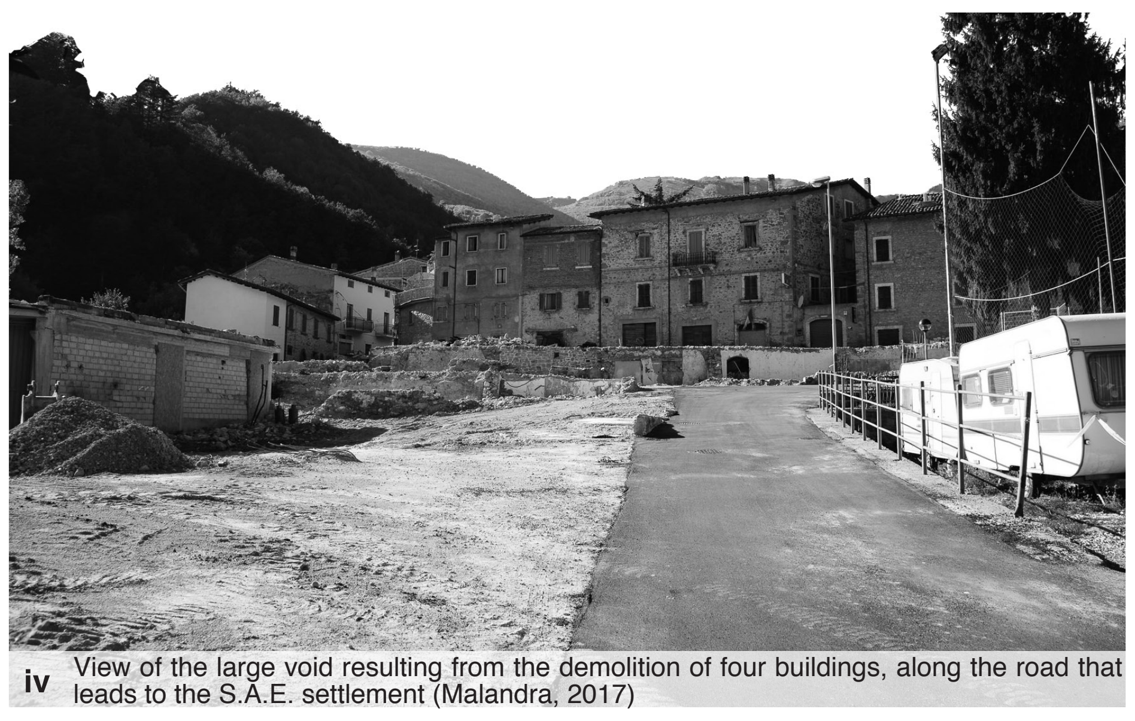

iii Demolition of the houses that defined the road bifurcation from the Provincial Road 89 (Malandra, 2017)

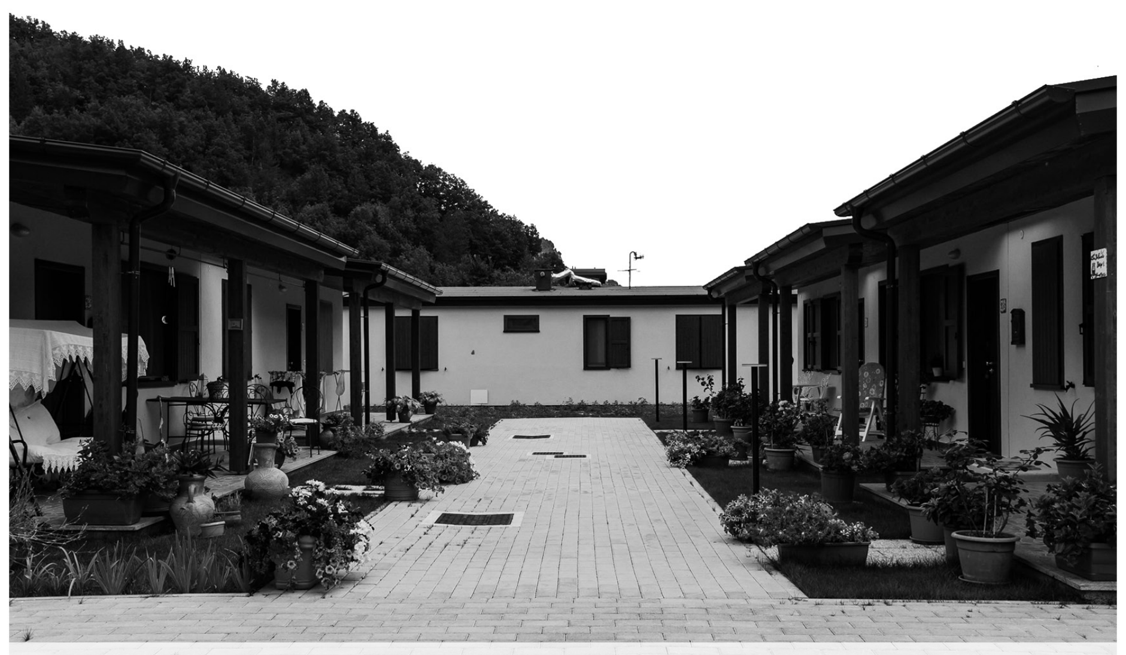

v View of the Borgo S.A.E. settlement on the area of the ex-football fields (Malandra, 2017)

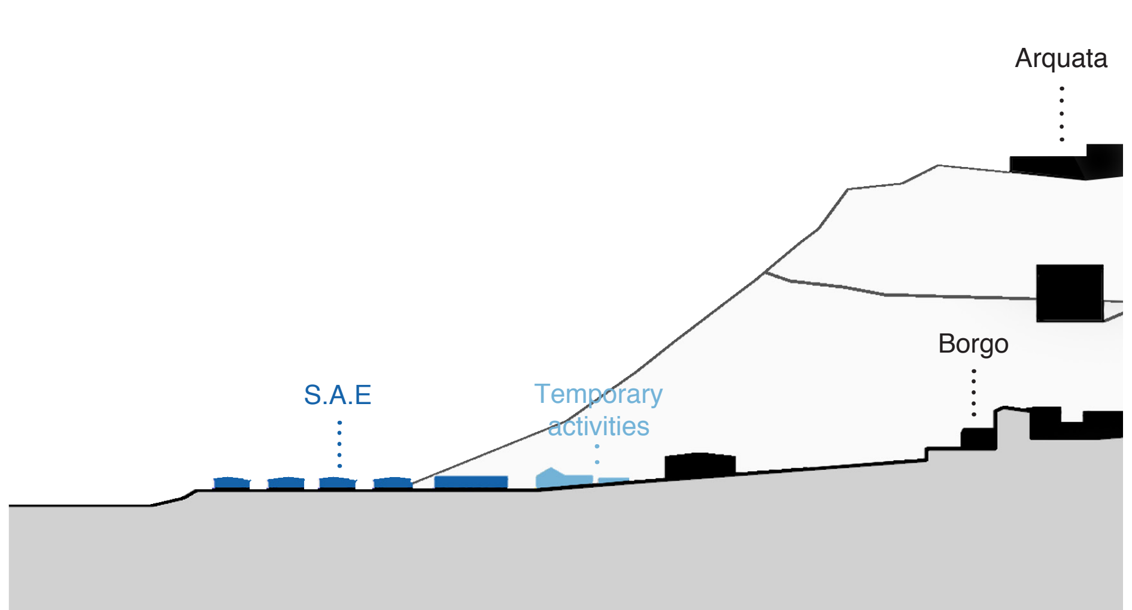


Section BB Scale 1:2,000


ii Damaged houses along the Provincial Road 89, in the centre of Borgo (Malandra, 2017)


iv View of the large void resulting from the demolition of four buildings, along the road that leads to the S.A.E. settlement (Malandra, 2017)


vi View of the "space in between" among the S.A.E. units (Malandra, 2017)



Section AA Scale 1:2,000

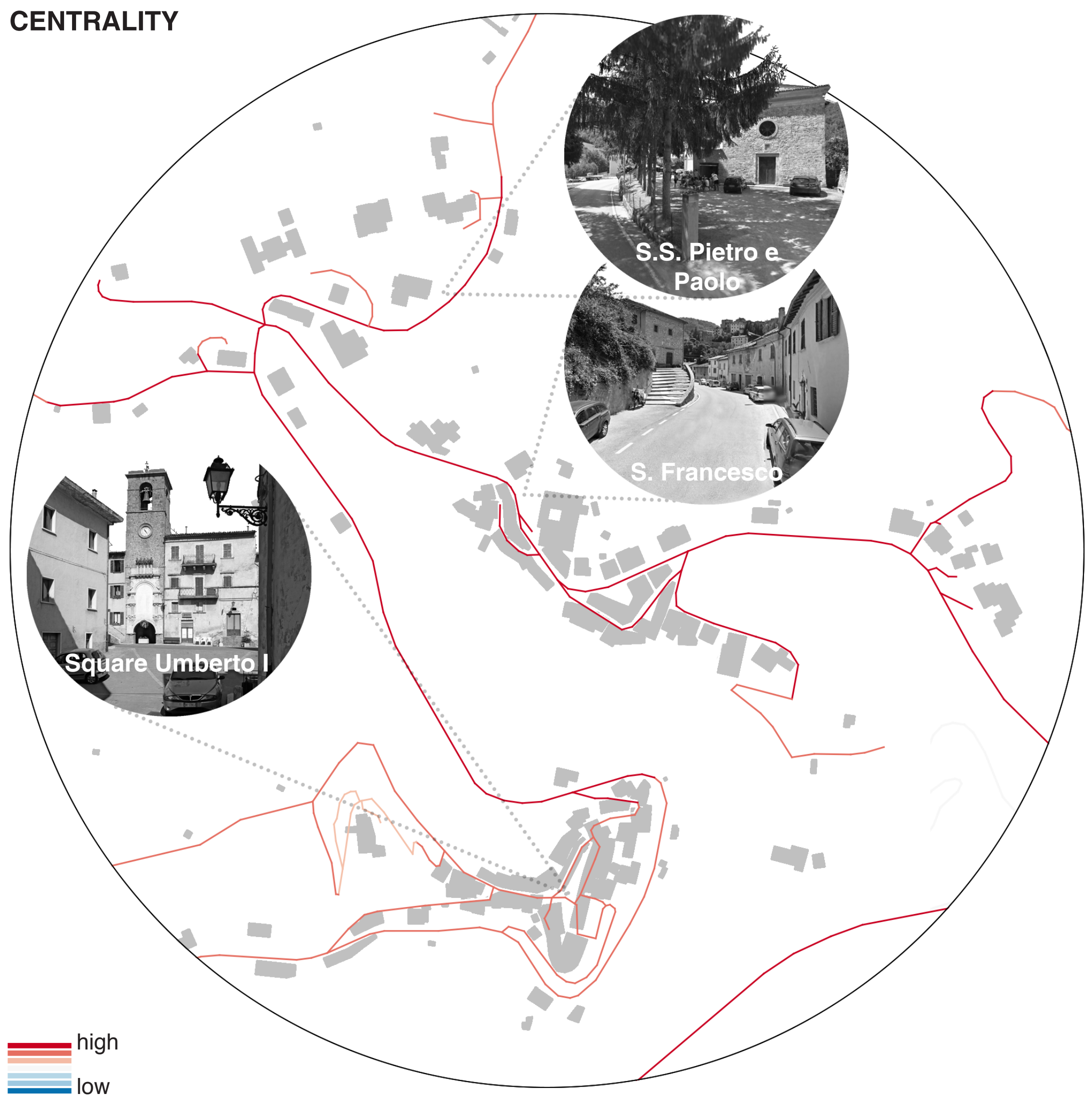
BORGO DI ARQUATA
DIACHRONIC ANALYSES

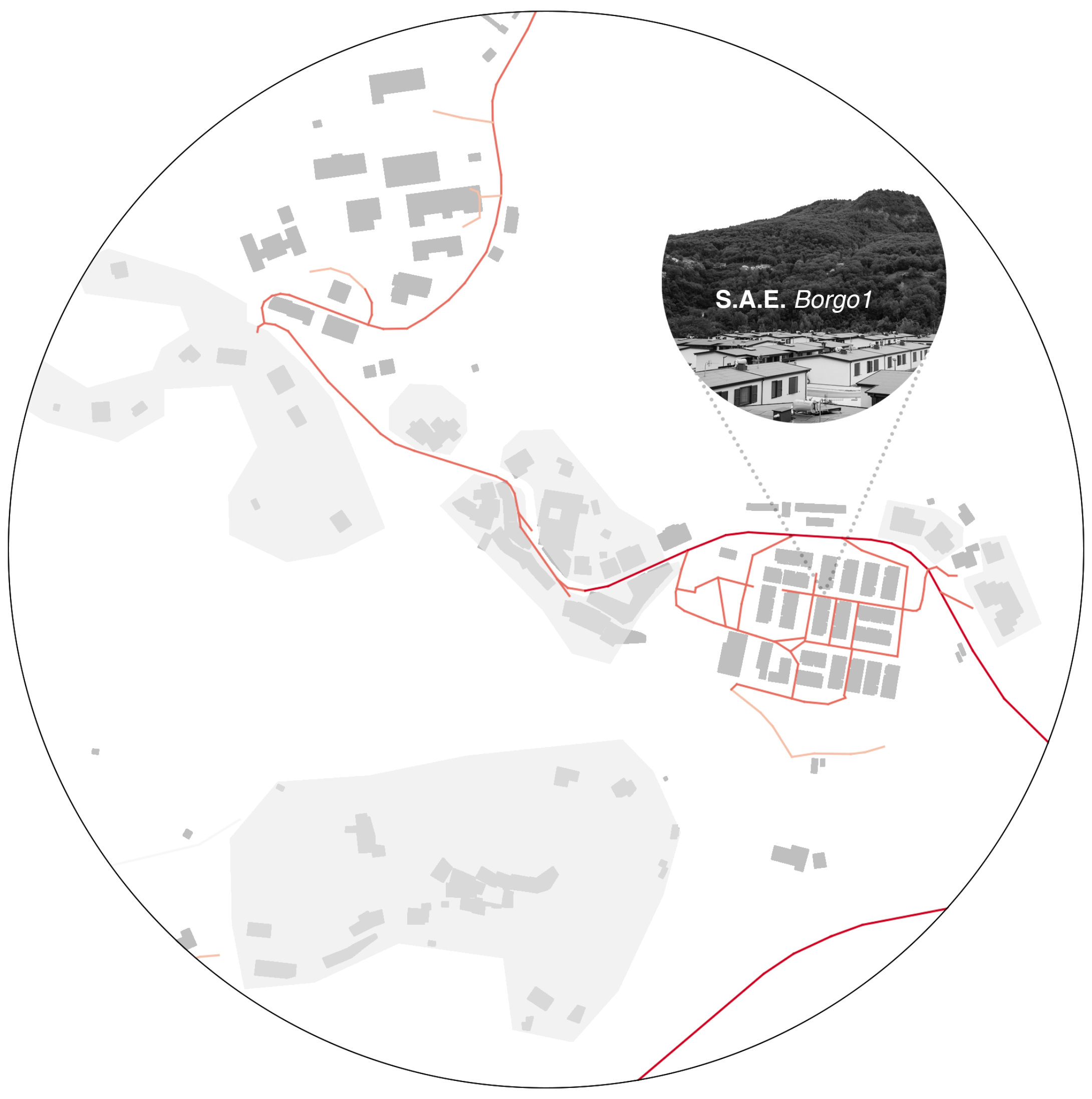
BEFORE EARTHQUAKE (T1)
The hamlets of Arquata and Borgo turn out to be very central areas of the territory, confirming their historic role as **capital and economic hub**, respectively. Regarding the flows of traffic, the main roads are the Provincial Roads 89 and 129 which cross the two towns; it is interesting to note that the road that passes through Arquata with an high choice value is the one of the historical re-enactment "**Alla Corte della Regina**" (To the Court of Queen), the most significant traditional event of the Municipality.

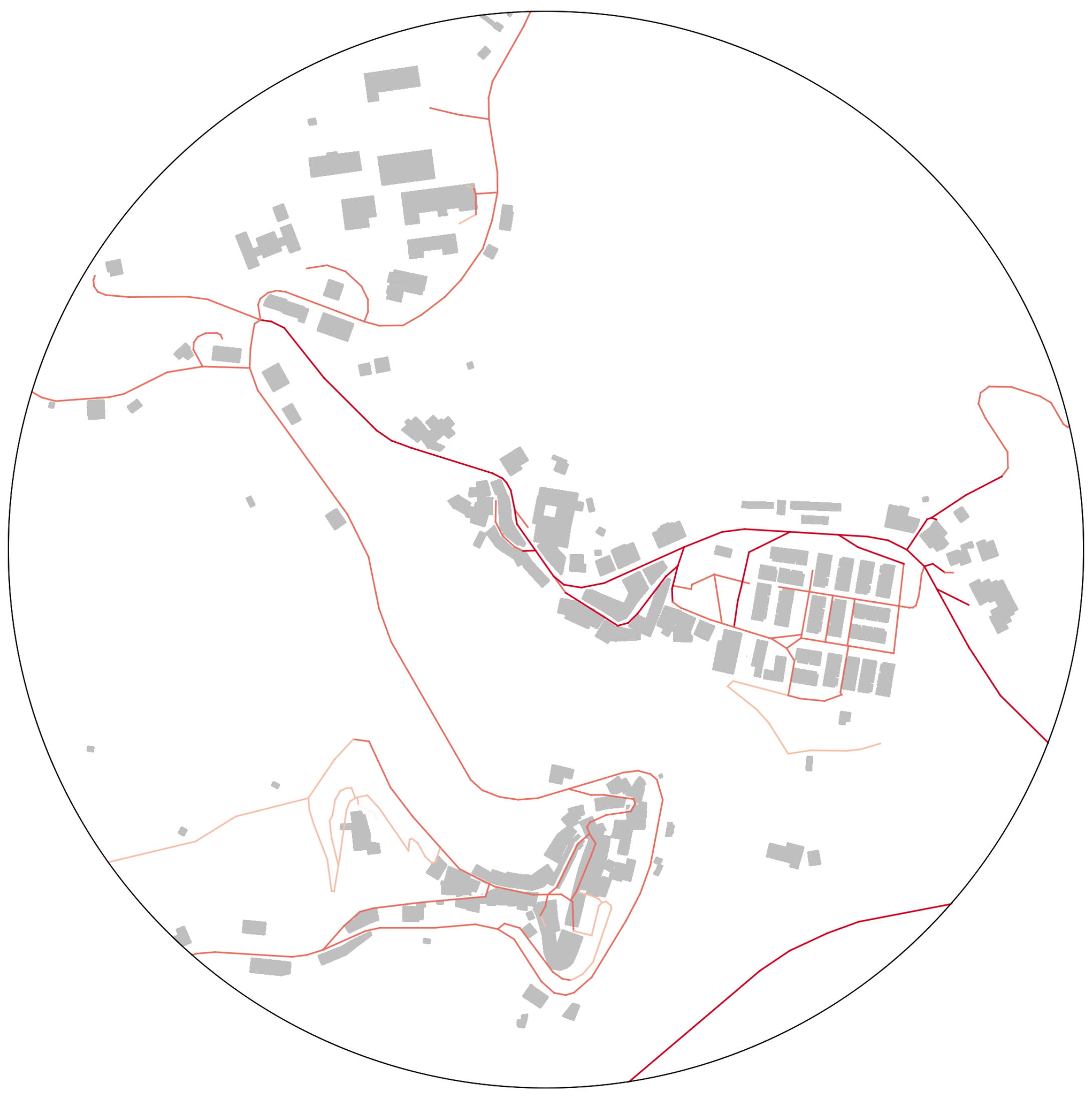
TODAY (T3)
With the red zones off-limits and the new roads resulting from the construction of to the emergency settlement, this last configures itself as a **newly built centre**, substitute for the historical one: according to the configurational analysis, the Provincial Road 89 strengthens its importance and the S.A.E. new streets are meant to acquire economic value and social desirability. The historical re-enactment "Alla Corte della Regina" now takes place along the Provincial Road 89, from the emergency settlements *Borgo2* to the other one *Borgo1*.

AFTER THE RECONSTRUCTION (**T4** hypothesis of "as it was, where it was")
The historic centre of Arquata, even in the case of its complete reconstruction, following the principle of "com'era dov'era" (as it was, where it was), with the permanence of the emergency settlement, loses its pre-disaster strong centrality. There are still quite high values of integration and choice, but the busiest roads cross the hamlet of Borgo, excluding the capital. Also, the new settlement would compete with the recovered town as a **duplicate centre**, at least until its dismantling.

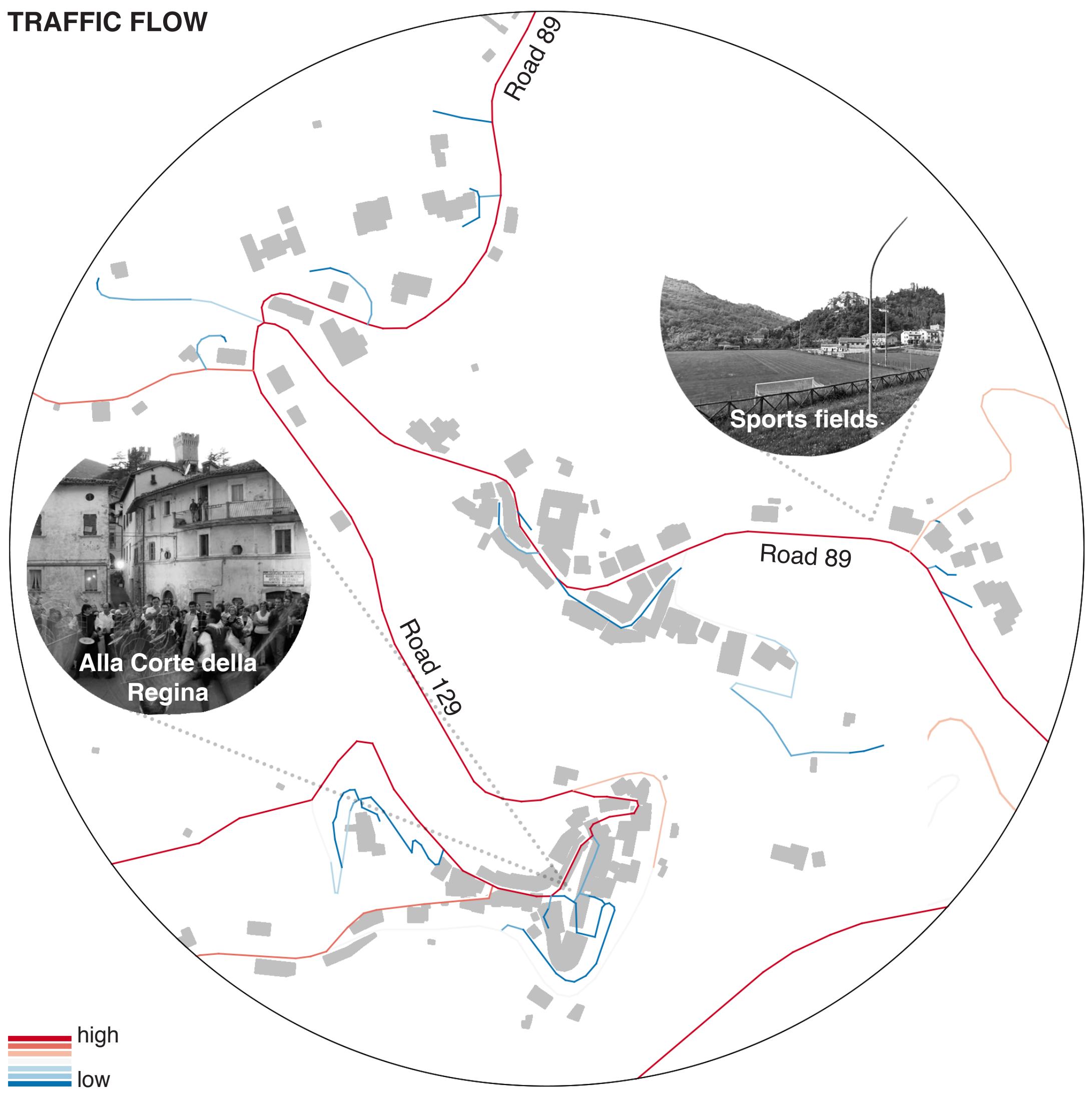
CENTRALITY

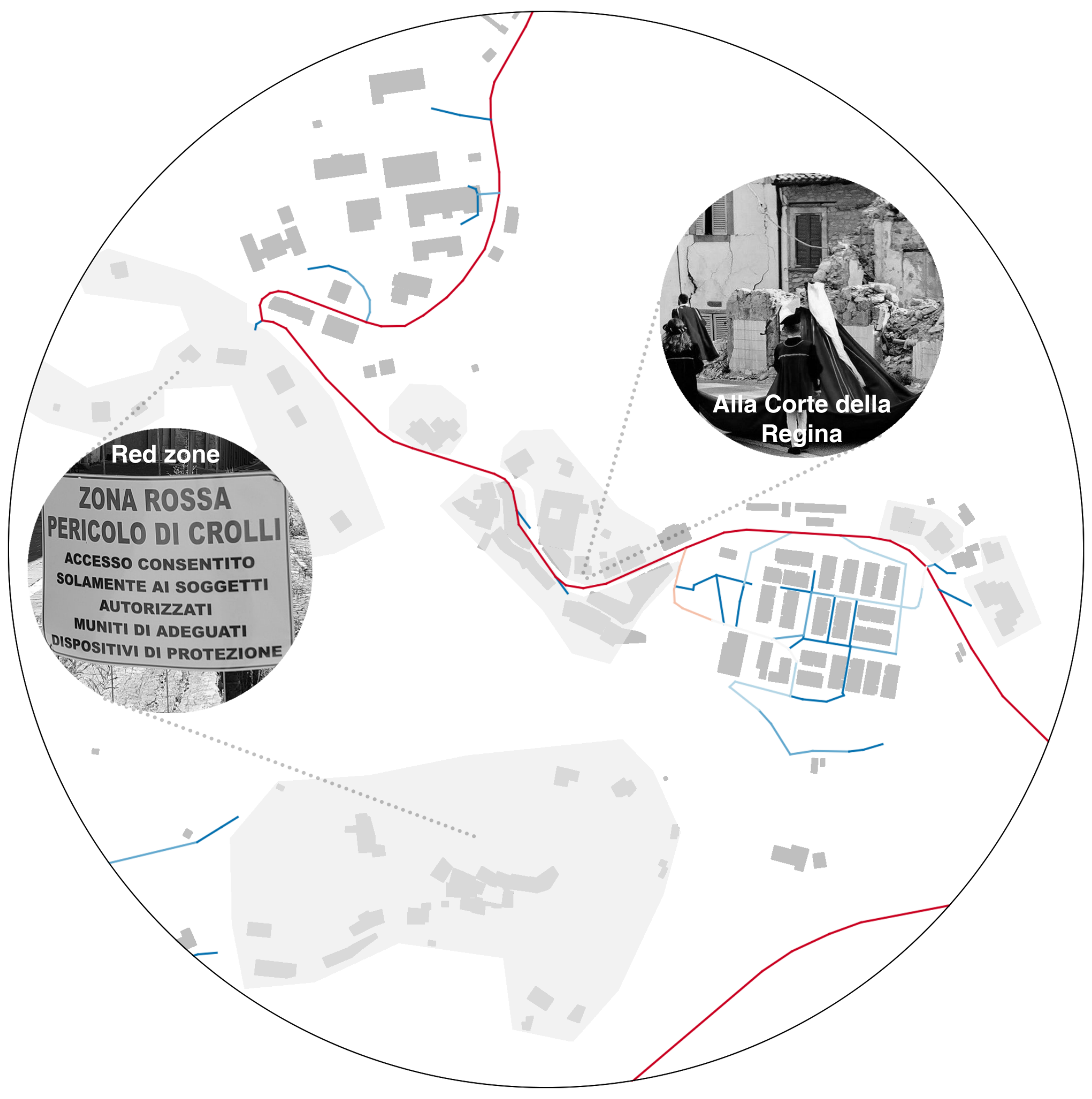


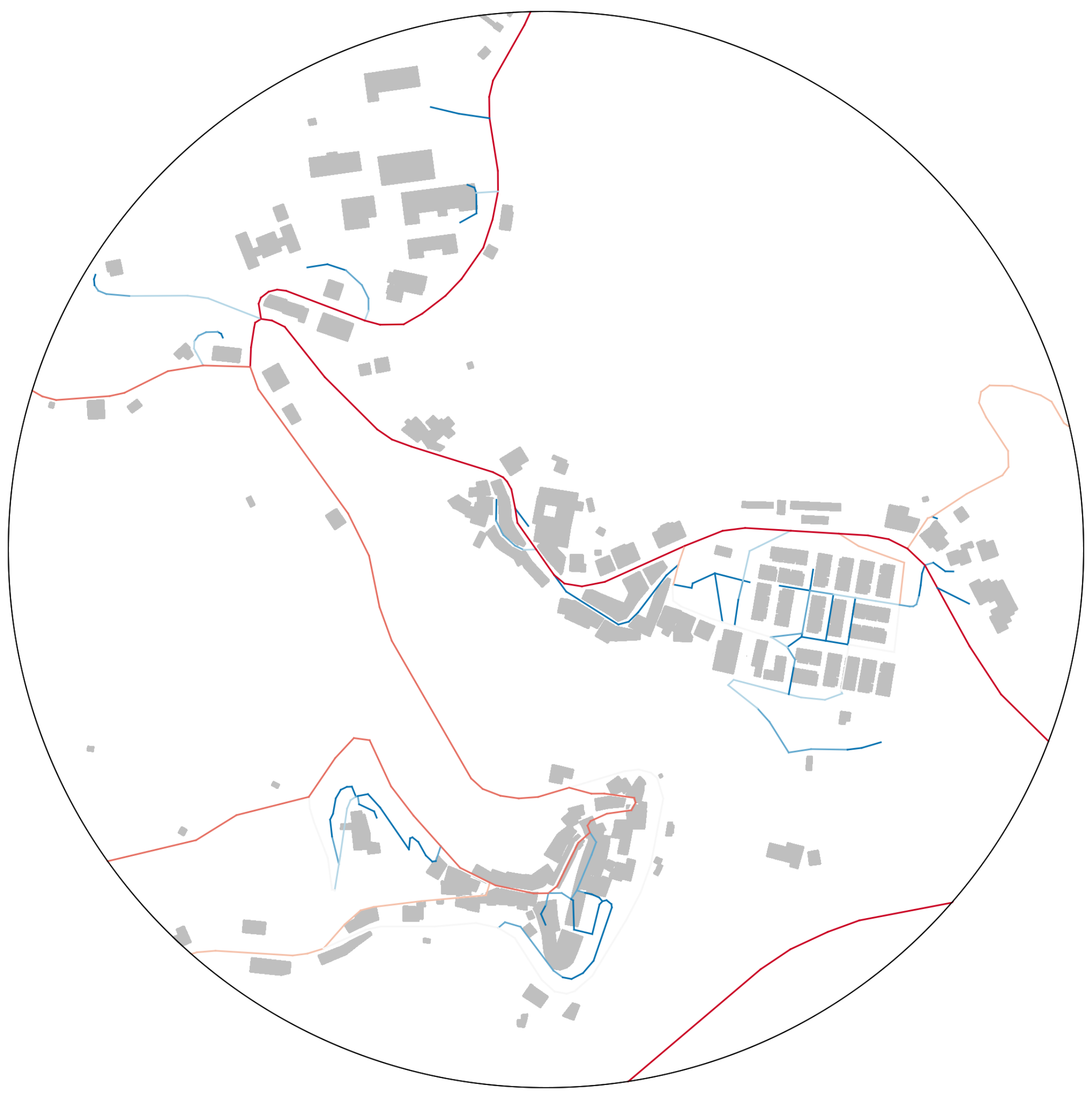




TRAFFIC FLOW




Alla Corte della Regina
Red zone
ZONA ROSSA
PERICOLO DI CROLLI
ACCESSO CONSENTITO SOLAMENTE AI SOGGETTI AUTORIZZATI MUNITI DI ADEGUATI DISPOSITIVI DI PROTEZIONE



Hypothesis

LISTENING TO PEOPLE'S VOICES

The testimonials of the inhabitants of the Borgo S.A.E., gathered by the author's survey – distributed during a visit to Arquata del Tronto on 13 and 14 September 2019 –, allow to understand how people's lives have changed after the earthquake, due to the unavailability of their homes and towns.
Investigating the perceived quality of the space inside and outside the S.A.E. units, the respondents (almost exclusively over 50), complain of the "lack of inner space for the daily life" and the "impossibility to host relatives and friends"; regarding the outdoor environment, what does not satisfy is that during the day there is not much to do, there are no meeting places (except for the bar of the village) nor a real square: "Borgo is the only hamlet without a multipurpose centre". Every day, many are the residents who go to their plots of land, outside the S.A.E. village, to meet their friends and spend time together.

> (Translation from Italian) "It may be utopian but, in my opinion, it should be created a space that remind us what our towns were like before the earthquake. Villages now look like dormitories." (Female, 55 years old)

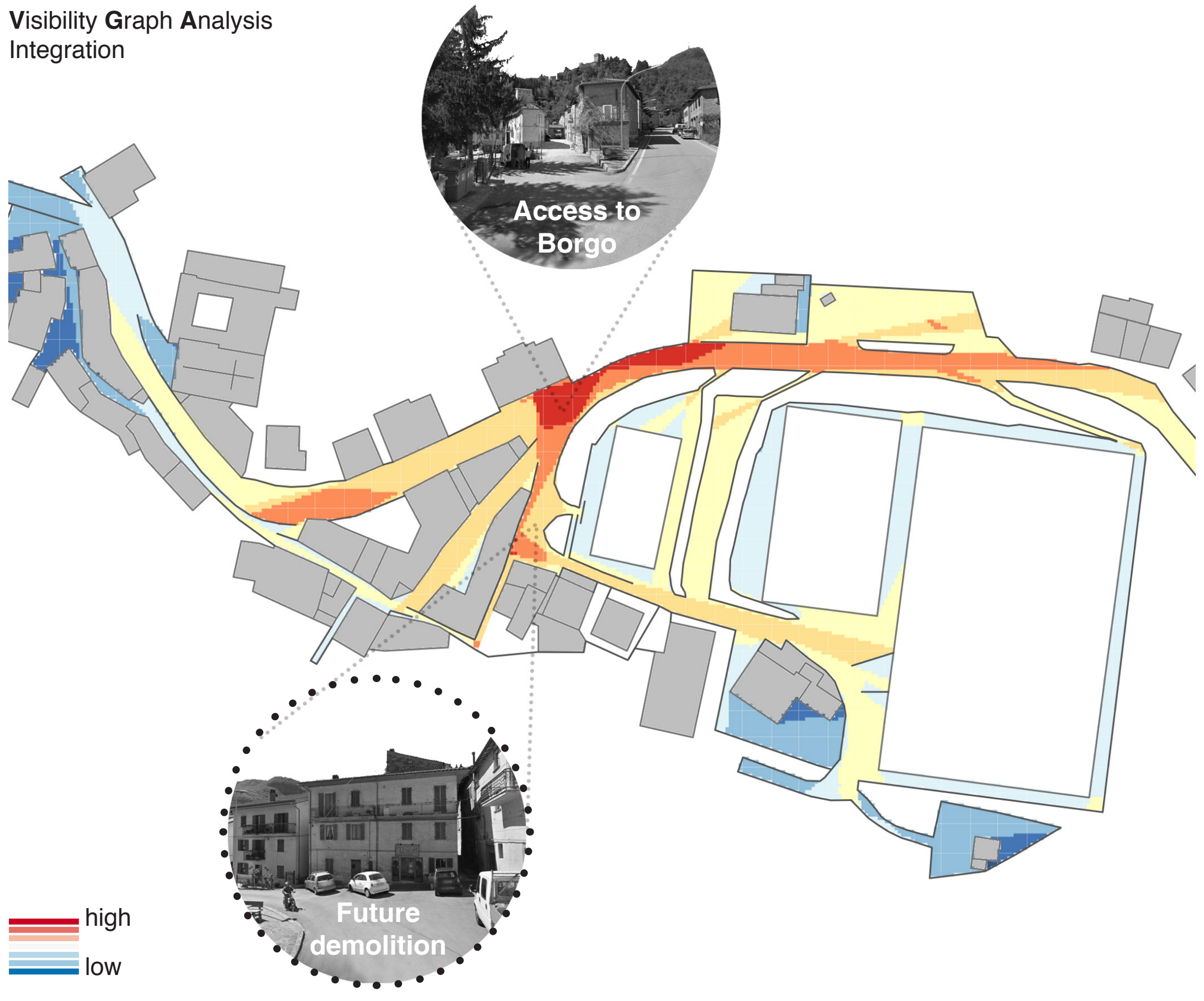
To understand the spatial properties of the external environment, to grasp the opportunities and mitigate the critical points, we once again resorted to the configurational theory, passing to the infra-urban scale of the emergency settlement and of the hamlet of Borgo.

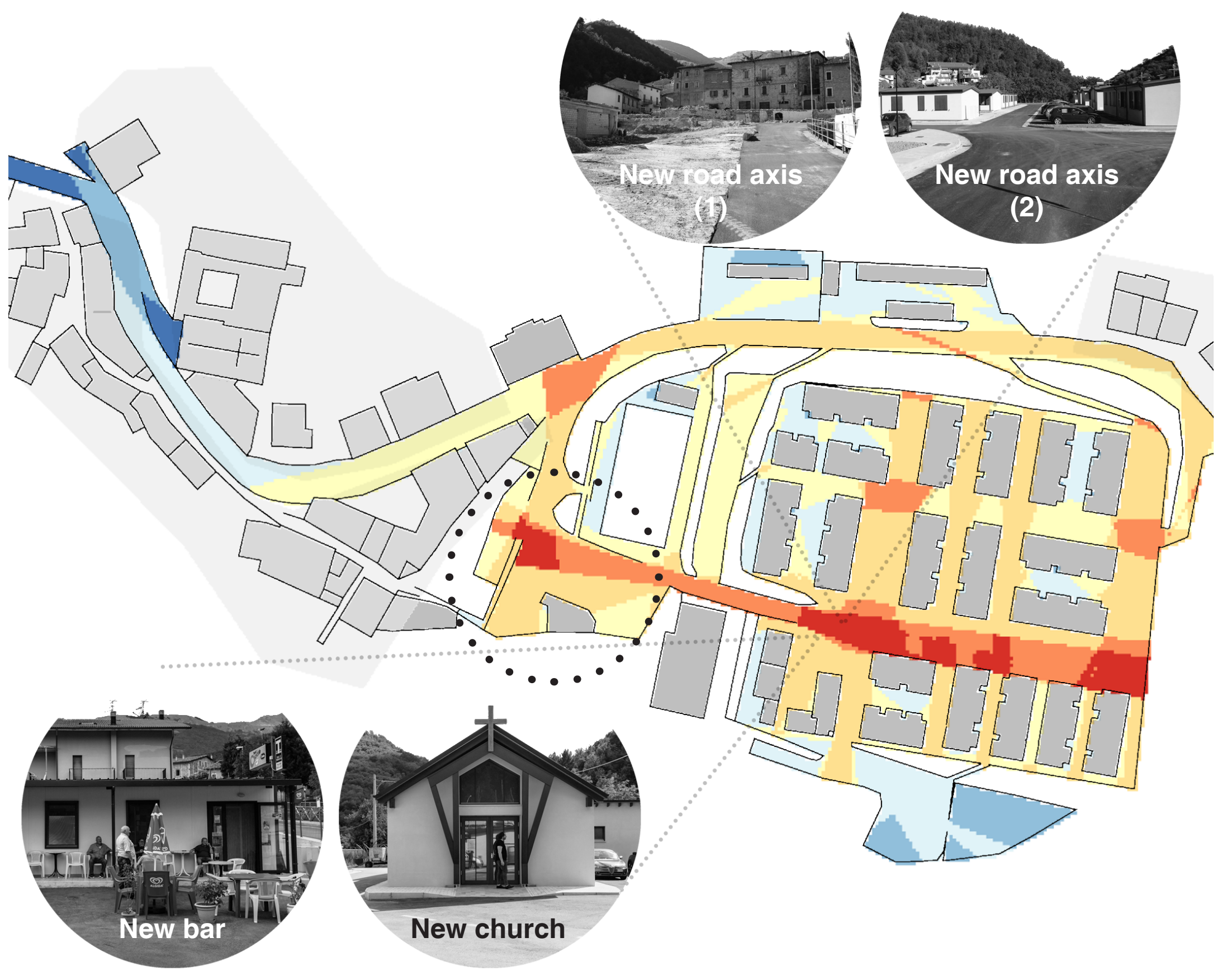
BEFORE EARTHQUAKE (T1)
The Visual Graph Analysis (VGA) allow to investigate properties that are closely related to manifestations of spatial perception, such as way-finding, movement, and space use. The global measure of integration corresponds to accessibility, while the clustering coefficient is a local measure of intervisibility; spaces that have low clustering coefficient tend to correspond to locations where pedestrians make decisions on directions.

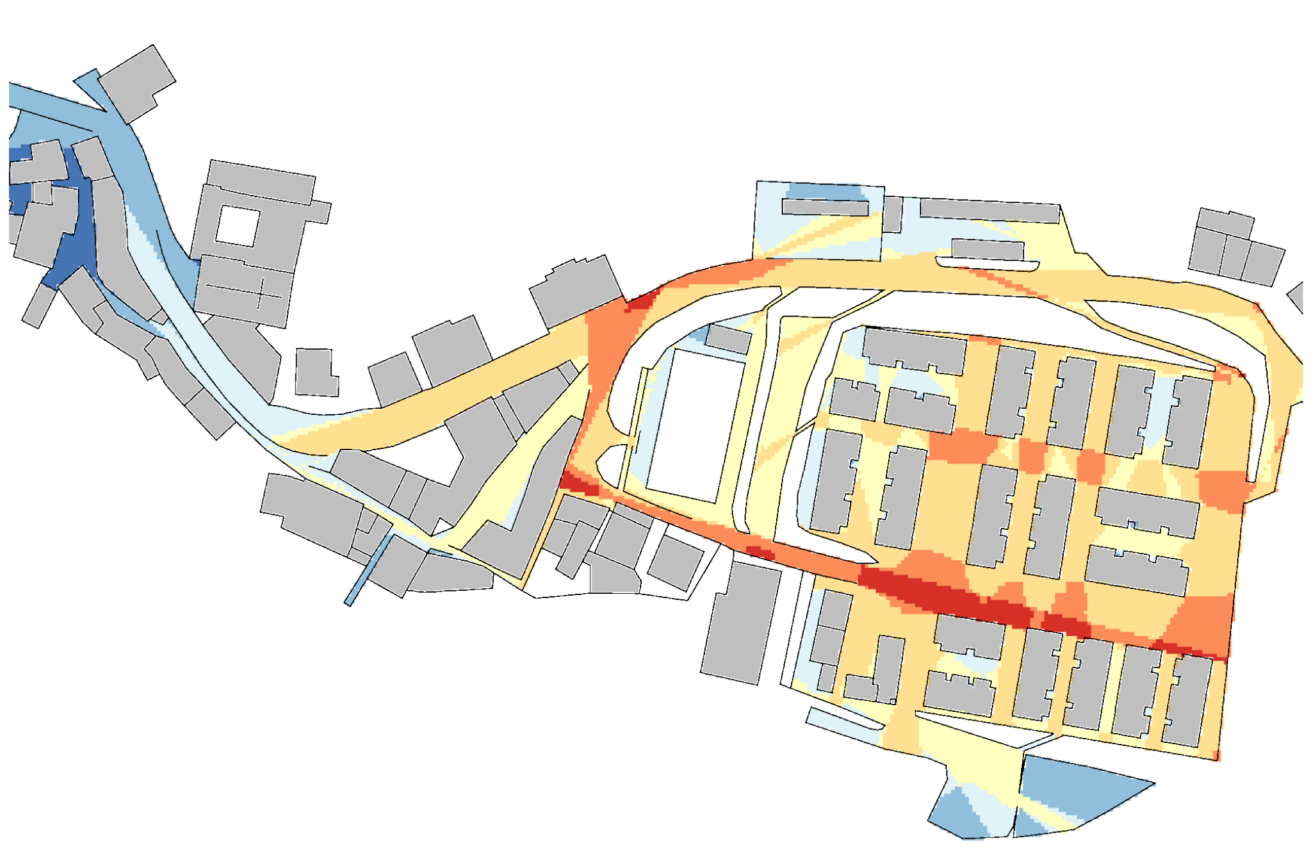
TODAY (T3)
After the earthquake and with the construction of the emergency settlement, a several of new open spaces spring up: they come in various sizes, from the little pockets between the S.A.E. units to the quite large esplanade resulting from the demolition of four damaged buildings. The most relevant result is the formation of the new road axis that crosses the village, with a very high value of accessibility and centrality.

AFTER THE RECONSTRUCTION (**T4** hypothesis of "as it was, where it was")
Even after the hypotetical reconstruction of the demolished buildings, the new road axis of the S.A.E. village has an high value of accessibility.

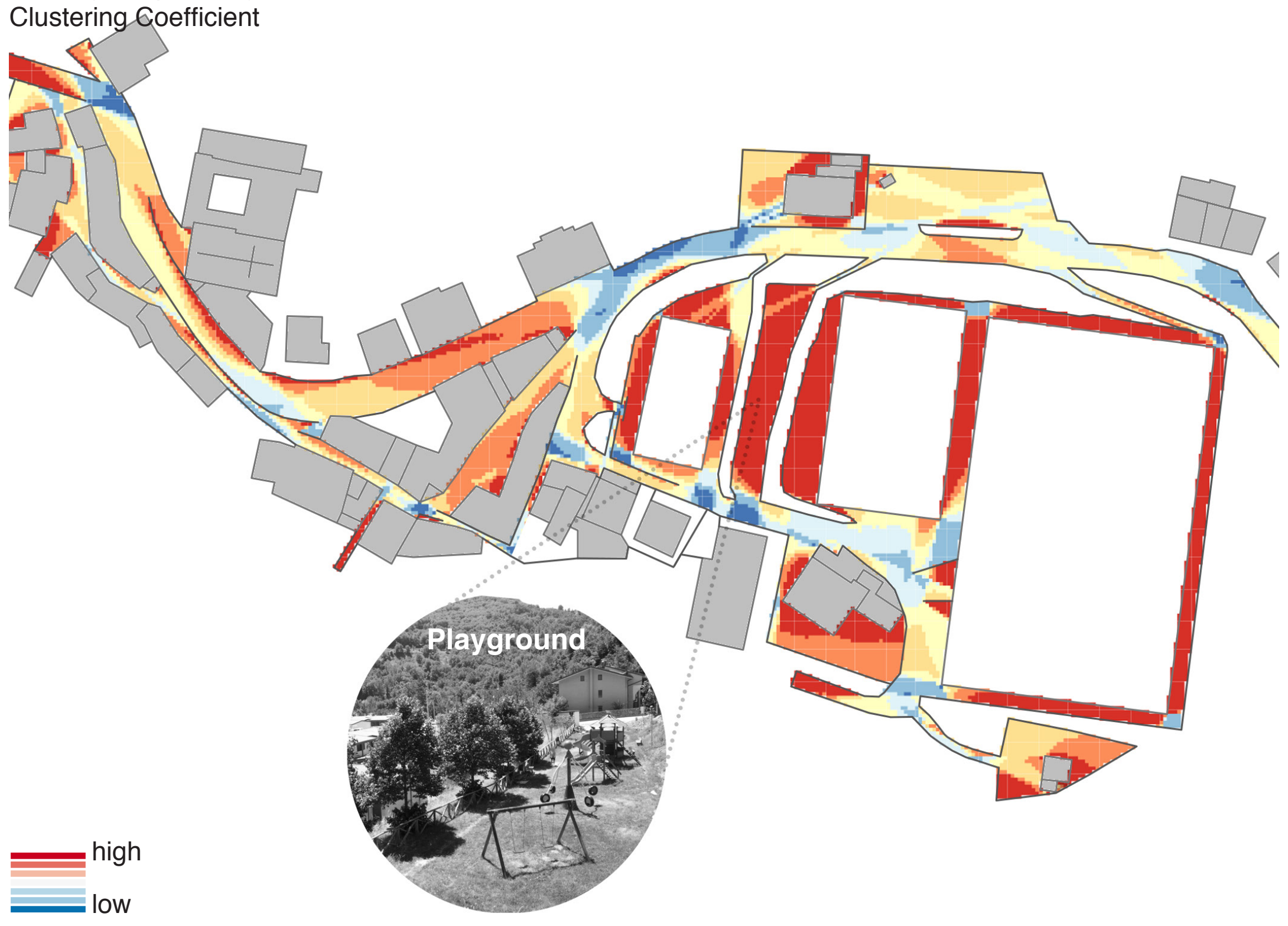
GATHERING
Visibility **G**raph **A**nalysis
Integration

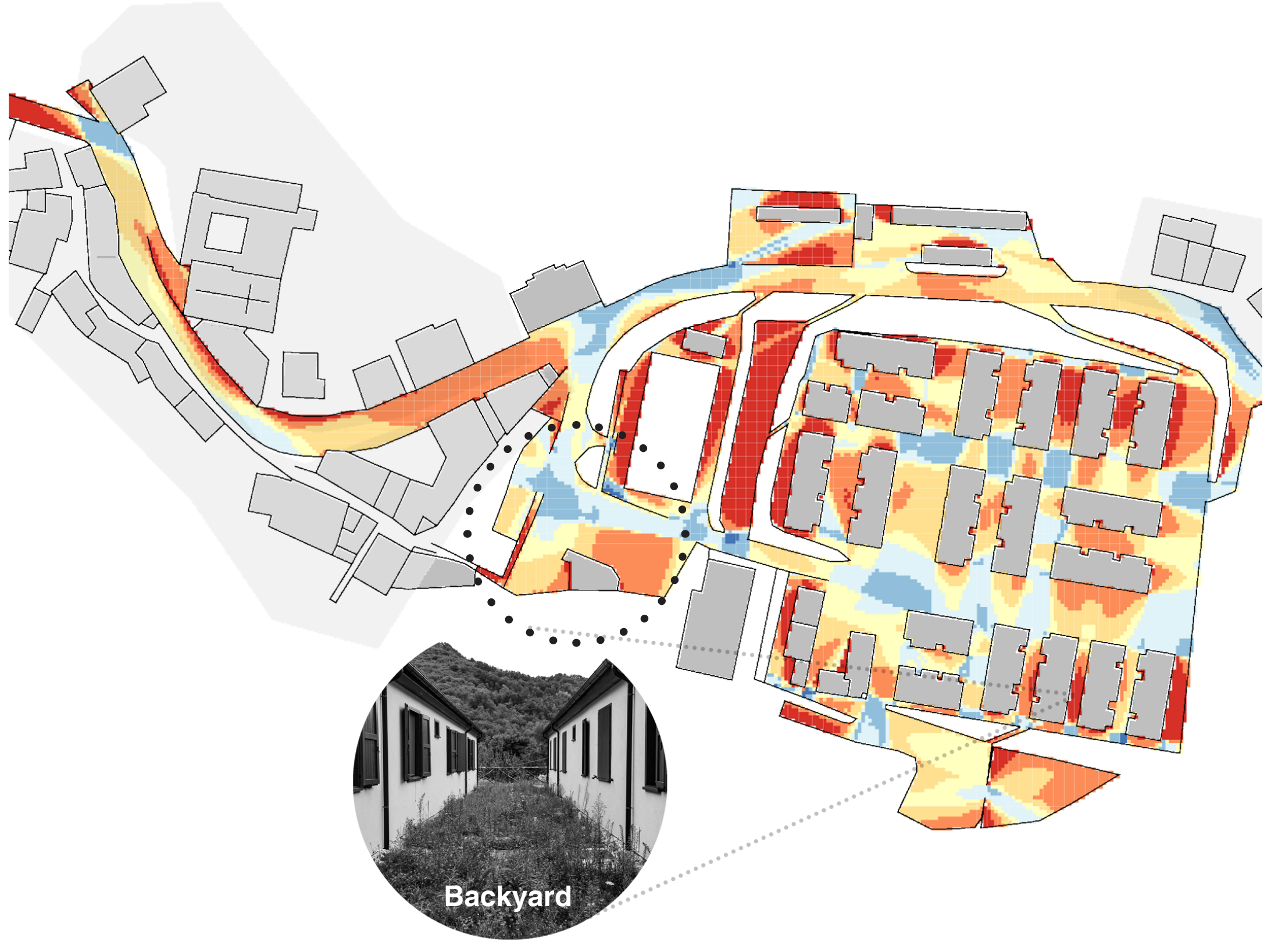


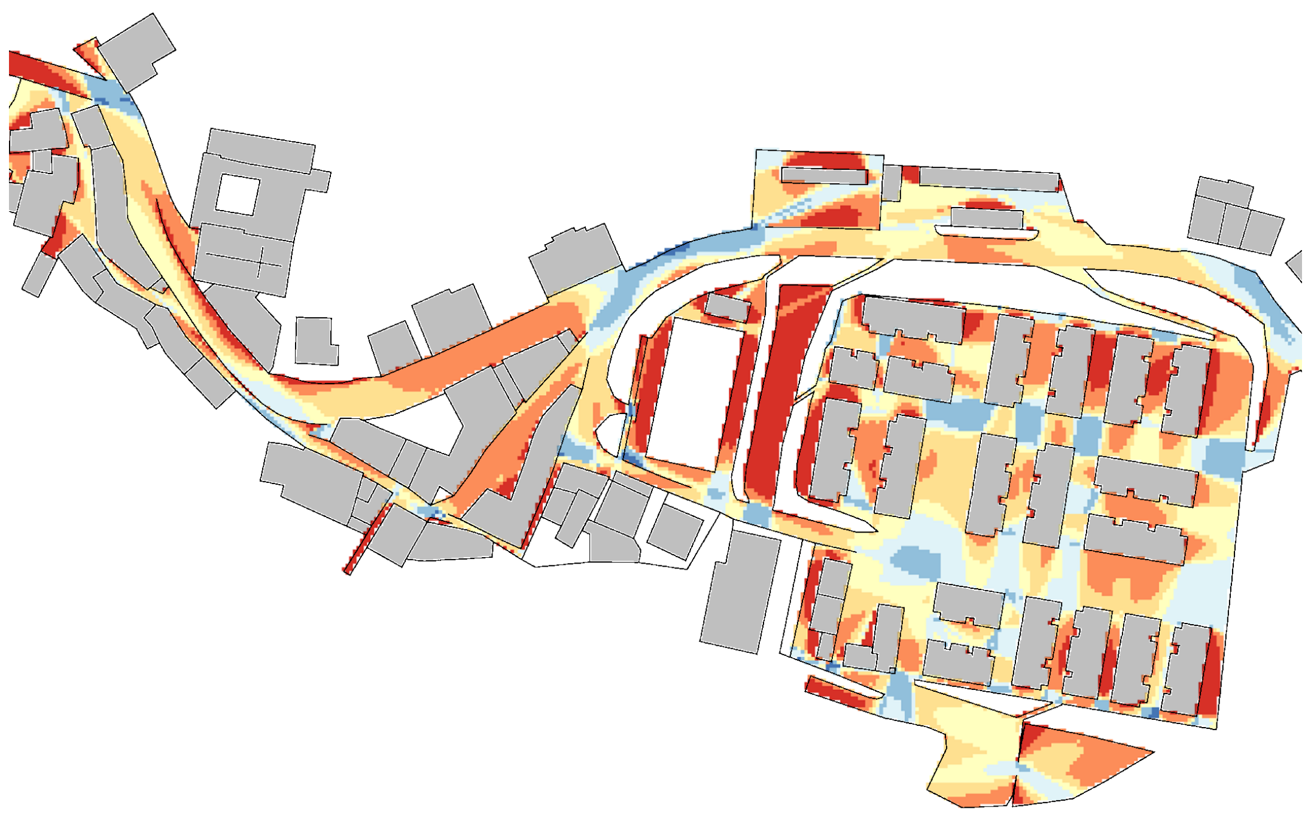




INTERVISIBILITY
Visibility **G**raph **A**nalysis
Clustering Coefficient







Hypothesis

FROM TEMPORARINESS TO PERMANENCE
THE CASE OF 'BORGO DI ARQUATA' AFTER THE 2016 CENTRAL ITALY EARTHQUAKE

Pisa University, School of Engineering
M.Sc. Architecture and Building Engineering
a.a. 2018/2019
Master thesis
Student:
Chiara Chioni
Supervisors: Prof. Ing. Valerio Cutini, Dr. Clarice Bleil de Souza,
PhD. Arch. Simone Rusci, Arch. Ing. Camilla Pezzica

GUIDELINES FOR INTERVENTION

MUNICIPALITY'S PRIORITIES

- Return of residents to their homes;
- Socio-economic revitalization of the territory;
- Morphological and functional redevelopment of the urban system, even through the redefinition of public spaces;
- Improvement of the functioning of the urban system in case of emergency.

To pursue these objectives, in 2018 the Administration proceed to the variation of the temporary emergency occupation to the definitive occupation prearranged to the expropriation: the costs of restoring the initial conditions of the occupied areas are not foreseen in any plans and would be extremely expensive / impossible to carry out. So, *it is legitimate to imagine a future scenario in which the S.A.E. units will remain on their place*.

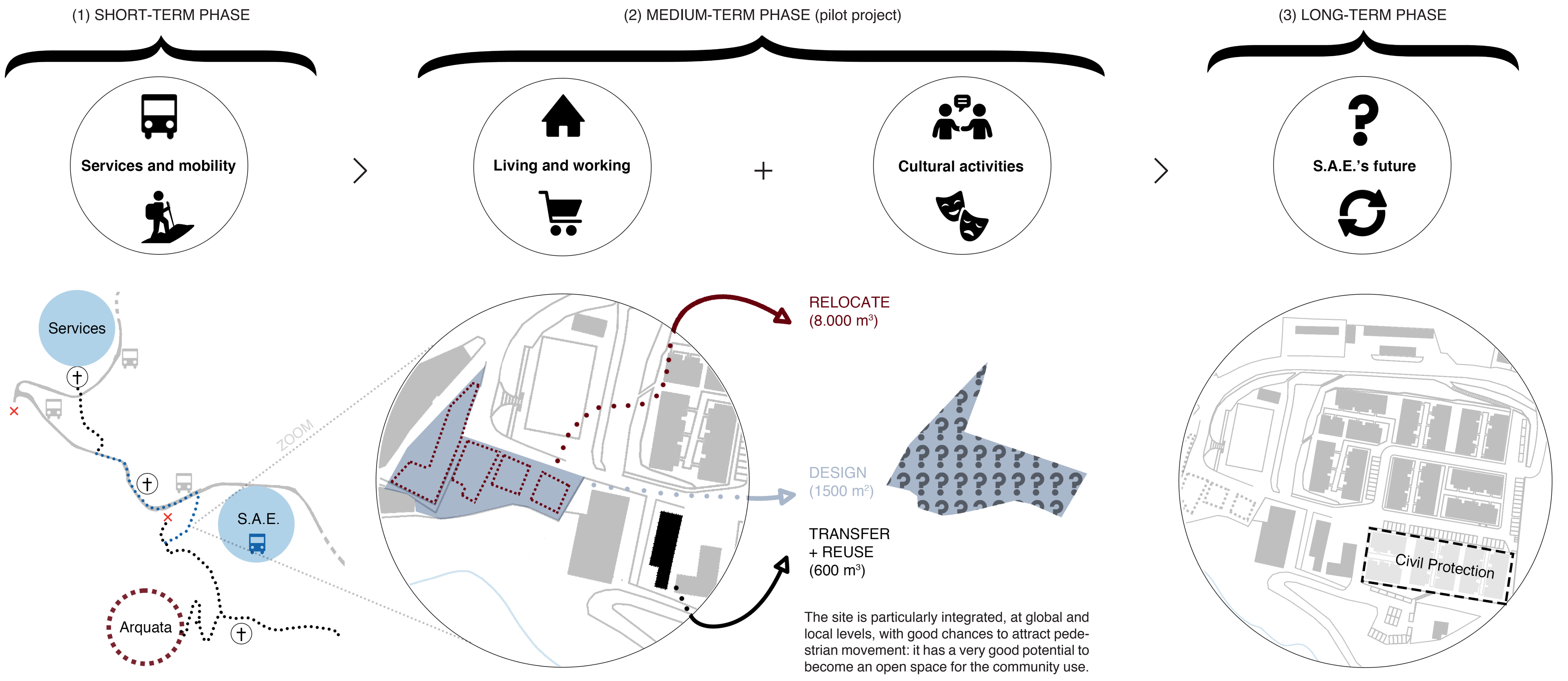
TIMELINE OF INTERVENTION

An effective urban settlement is one that promotes a "sense of place" and is attractive to visitors and long-term "participants":

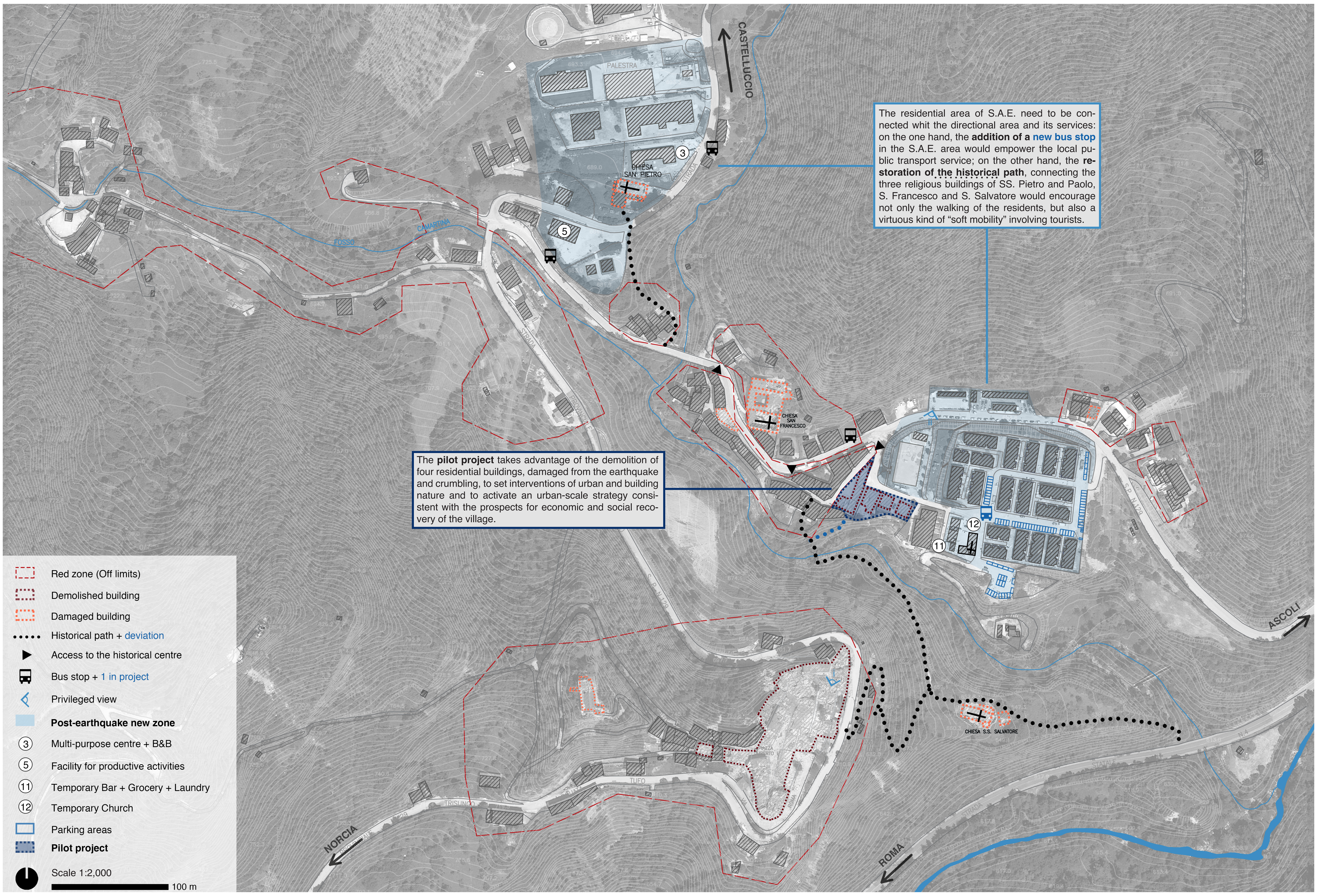
(1) Short-term phase: the first objective to be achieved regards the recovery of the public and the pedestrian mobility within the Municipality, between hamlets and S.A.E. areas.

(2) Medium-term phase (pilot project): proposing an open space for community use and building an anti-seismic structure with mix-uses (residential and commercial) would, on one hand, rehouse part of the residents, and on the other, permanently relocate the (so far) temporary shopping facilities located in the S.A.E. area.

(3) Long-term phase: the S.A.E. area need to be redesigned by ensuring the presence of a zone for the Civil Protection (in view of possible future events) and by the transformation of the units into something permanent as (i) an holiday camp for tourists, (ii) a second-homes village for non-residents or as (iii) the new location for the destroyed hamlet of Pescara del Tronto.



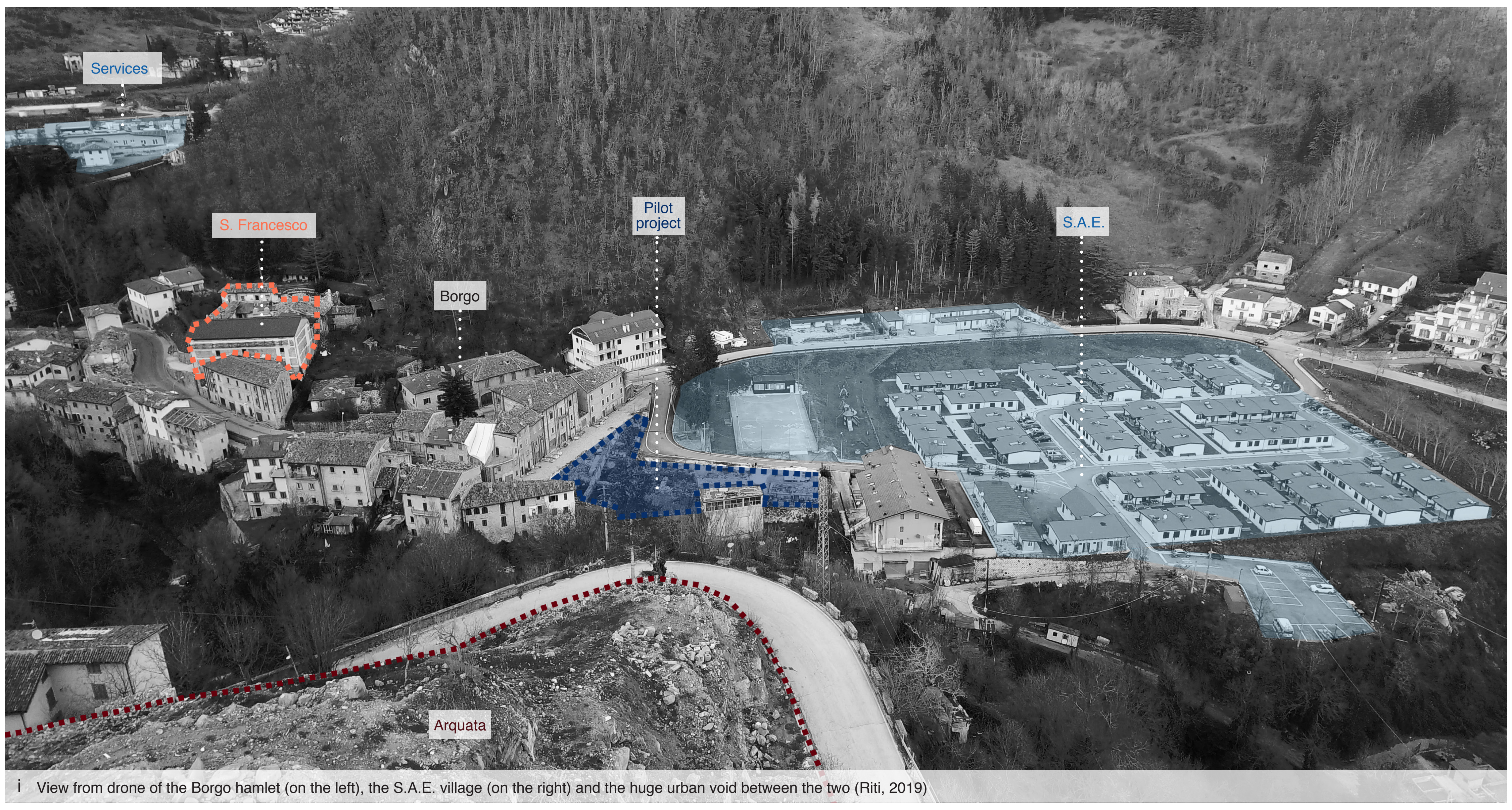
The site is particularly integrated, at global and local levels, with good chances to attract pedestrian movement: it has a very good potential to become an open space for the community use.



The residential area of S.A.E. need to be connected whit the directional area and its services: on the one hand, the **addition of a new bus stop** in the S.A.E. area would empower the local public transport service; on the other hand, the **restoration of the historical path**, connecting the three religious buildings of SS. Pietro and Paolo, S. Francesco and S. Salvatore would encourage not only the walking of the residents, but also a virtuous kind of "soft mobility" involving tourists.

The **pilot project** takes advantage of the demolition of four residential buildings, damaged from the earthquake and crumbling, to set interventions of urban and building nature and to activate an urban-scale strategy consistent with the prospects for economic and social recovery of the village.

⬚	Red zone (Off limits)
⬚	Demolished building
⬚	Damaged building
••••••	Historical path + deviation
▶	Access to the historical centre
🚌	Bus stop + 1 in project
<	Privileged view
▭	**Post-earthquake new zone**
③	Multi-purpose centre + B&B
⑤	Facility for productive activities
⑪	Temporary Bar + Grocery + Laundry
⑫	Temporary Church
▭	Parking areas
▨	**Pilot project**
●	Scale 1:2,000 — 100 m



i View from drone of the Borgo hamlet (on the left), the S.A.E. village (on the right) and the huge urban void between the two (Riti, 2019)

ii Demolition of the four residential buildings (Malandra, 2017): the resulting void provides the location for the pilot project

PILOT PROJECT
GENESIS OF THE IDEA

In the waiting time in which the places recognizable by all as public spaces are compromised, it is necessary to deal with the opportunities that can arise from the new spaces generated after the disaster: therefore, the core of the project is located in the urban void between the historic nucleus of the town and the new post-emergency S.A.E. settlement.
This site is particularly integrated (i.e. central, accessible), both at global and local levels, and with good chances to attract pedestrian movement (i.e. commercial desirability), so it has a very good potential to become an open space for the community use, surrounded by mix-uses building.

CONFIGURATION-RELATED FEAUTURES

The potentiality of an urban place to favour interaction deals with the richness in its connections (i.e. connectivity); its capability to represent a meeting point deals with the number of the paths actually sharing that place (i.e. choice); its effectiveness for gathering people depends on its actual accessibility (i.e. integration). Furthermore, few geometric properties appear necessary: first, to encompass people and, at the same time, to inspire a feeling of human-scaled outdoor room, a square requires some prominent size and a certain grade of enclosure (i.e. neighbourhood size); lastly, to favour meeting and interaction, a square would be convex (i.e. clustering coefficient), as “place of glances”.

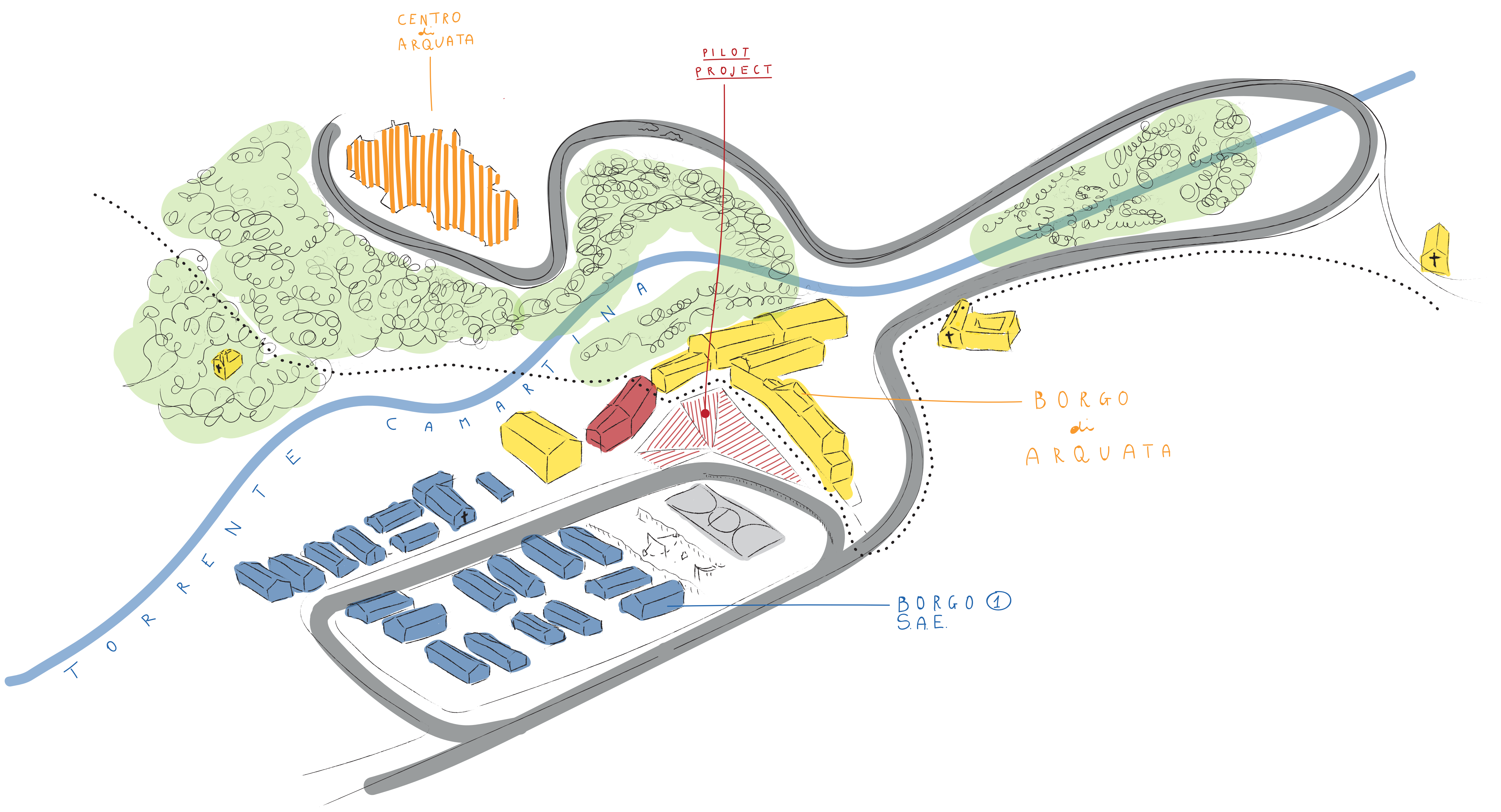
- **Design the form**

The first design step regarded the definition of a boundary, the mix-uses building, to reconstruct the southern edge; instead, the front adjacent to the road was not closed, because the street is part of the social space.
Then, the vertical connections between the different topographic levels were re-designed in a way that does not present physical/visual obstacles: four triangular “slices” are inclined in order to overcome the height difference between the various levels. This way people in the lower spaces provide the show to the people sitting or walking above and, as a result, the orography of the site will resemble an amphitheatre.

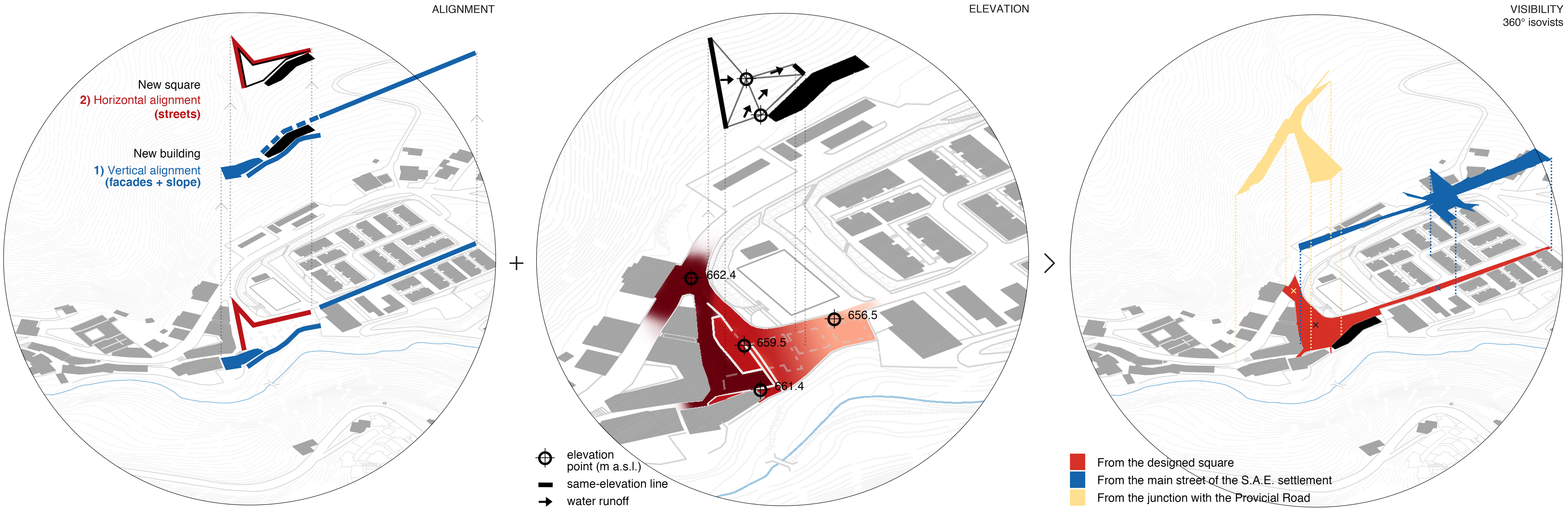
- **Project/suggest the function**

Concerning the new building, the proposal of the mix use derives from the strategic position in which it is placed: facing the square, the ground floor (area of about 480 mq) is destined to commercial and service activities such as the temporary ones, now located in the S.A.E. area (the bar and the grocery: total area of about 190 mq), and others specifically emerged from the survey distributed to the population (as a bakery and a newsstand). The other two floors were destinated to residential uses.

The open space of the square is both an area to stay and an area to move: the staying is favoured by the presence of a large place in which put seats, in which there are good visibility conditions of both the S.A.E. area, down the street, and the historic front of building, on the top of the slope, and with close proximity to the walking paths and the driveways.

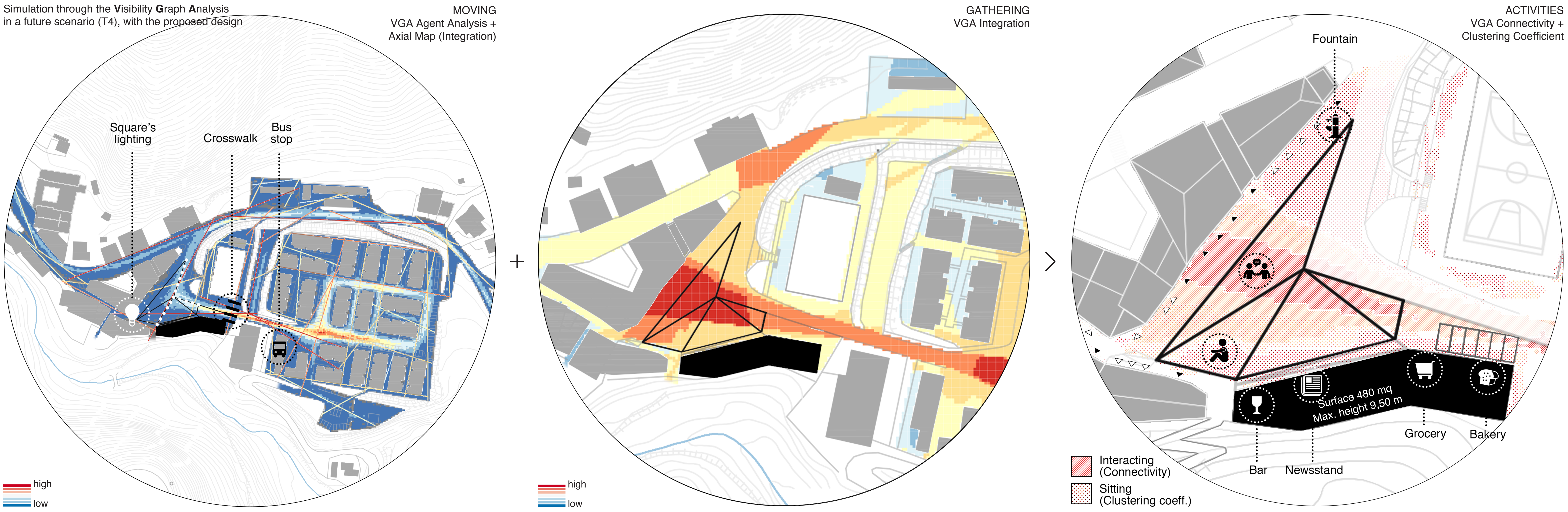


FORM

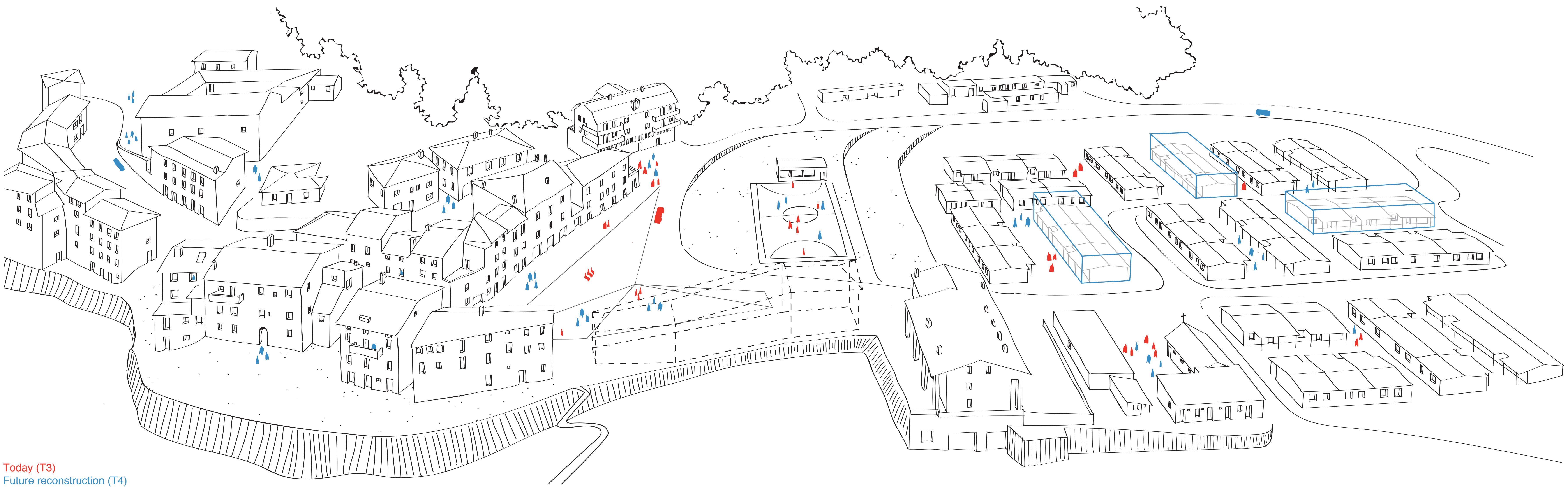

ALIGNMENT
New square
2) Horizontal alignment (streets)
New building
1) Vertical alignment (facades + slope)
+
ELEVATION
662.4
656.5
659.5
661.4
elevation point (m a.s.l.)
same-elevation line
water runoff
>
VISIBILITY
360° isovists
From the designed square
From the main street of the S.A.E. settlement
From the junction with the Provicial Road

FUNCTION

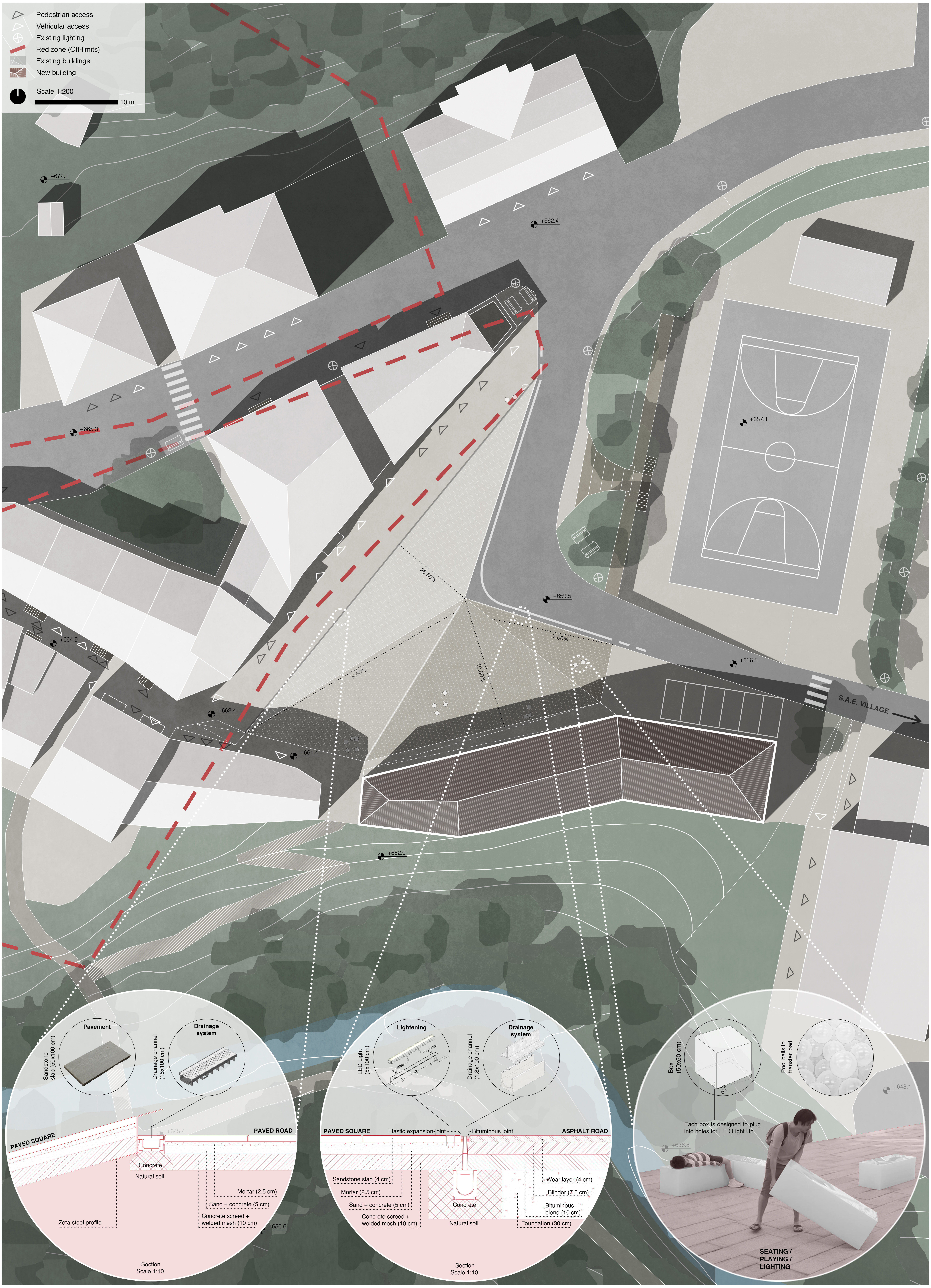
Simulation through the **V**isibility **G**raph **A**nalysis in a future scenario (T4), with the proposed design



LIVABILITY OF THE NEW URBAN SYSTEM



PILOT PROJECT
PLAN AND DETAILS



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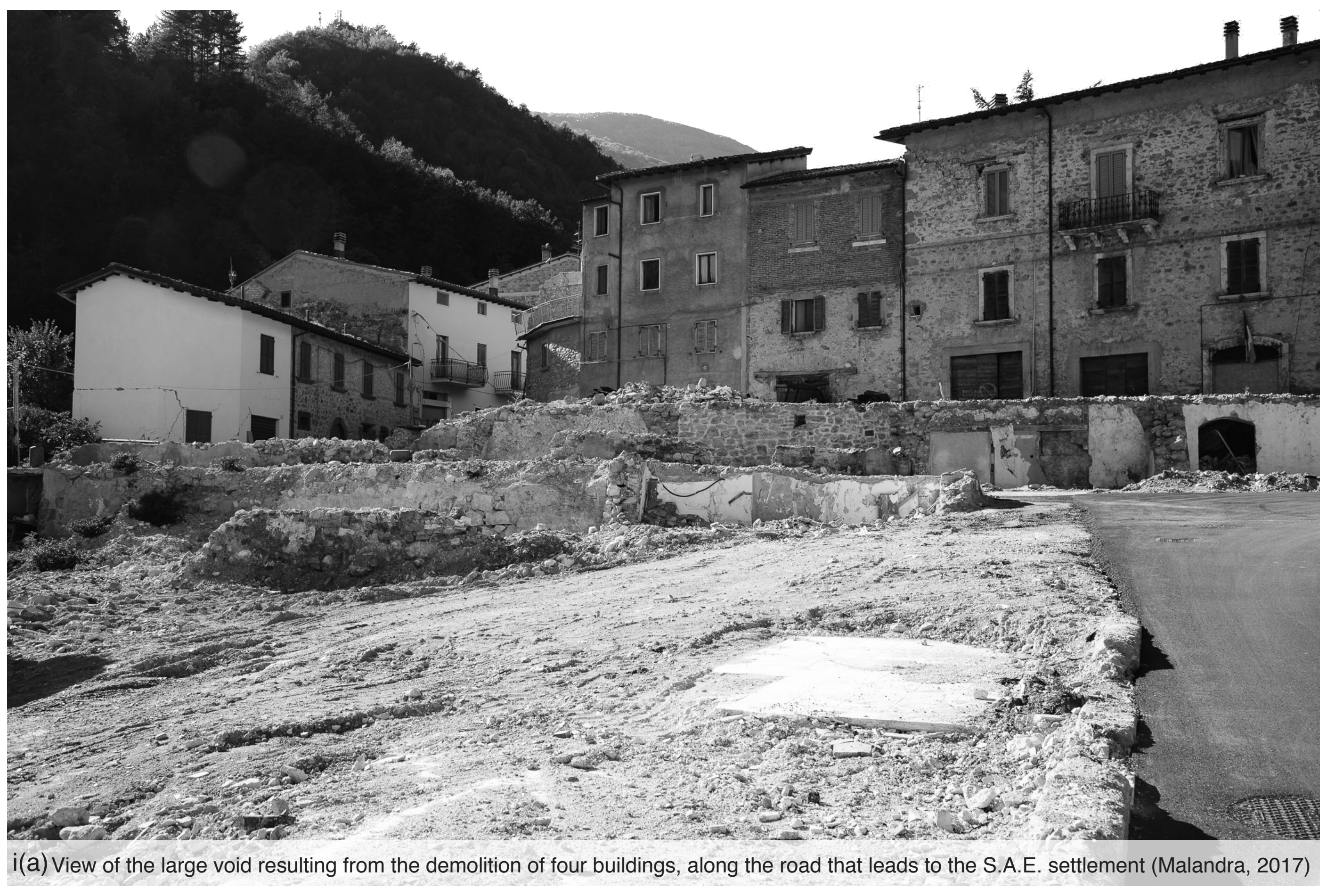
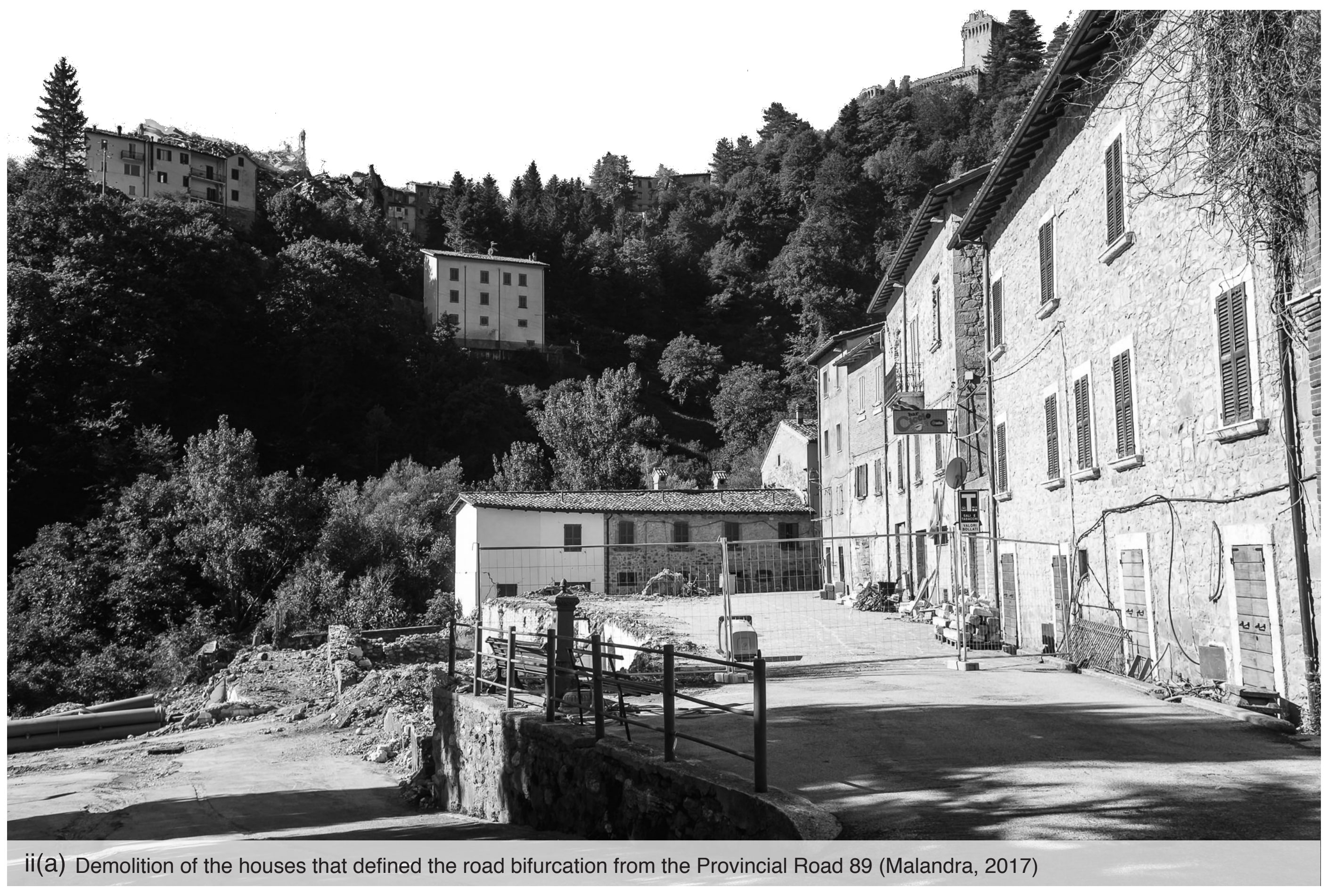
PILOT PROJECT
VISIONS

(a) Current situation
(b) Project situation

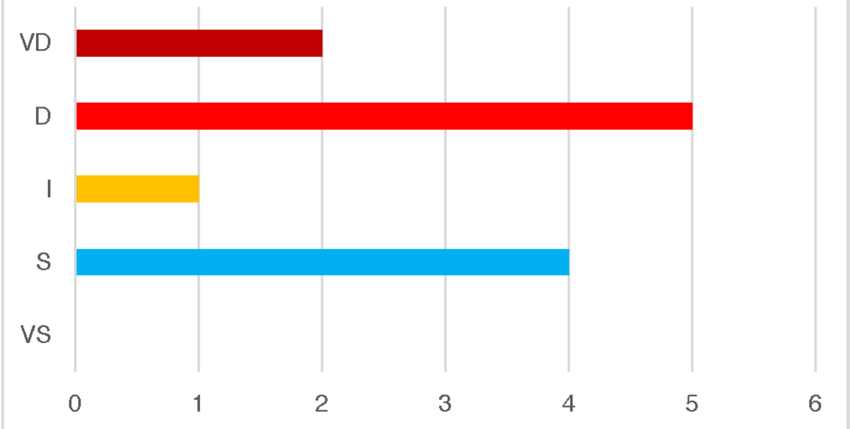
“Inside these settlements I don’t find the village-life I had in Trisungo, I miss the noises, the spaces and the people who lived in the town. The S.A.E. villages are artificial spaces, without a soul.” (Female, 45 years old)

Some results from the author’s survey – distributed during a visit to Arquata del Tronto on 13 and 14 September 2019:


i(a) View of the large void resulting from the demolition of four buildings, along the road that leads to the S.A.E. settlement (Malandra, 2017)

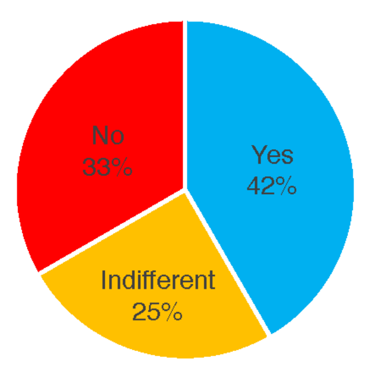

ii(a) Demolition of the houses that defined the road bifurcation from the Provincial Road 89 (Malandra, 2017)

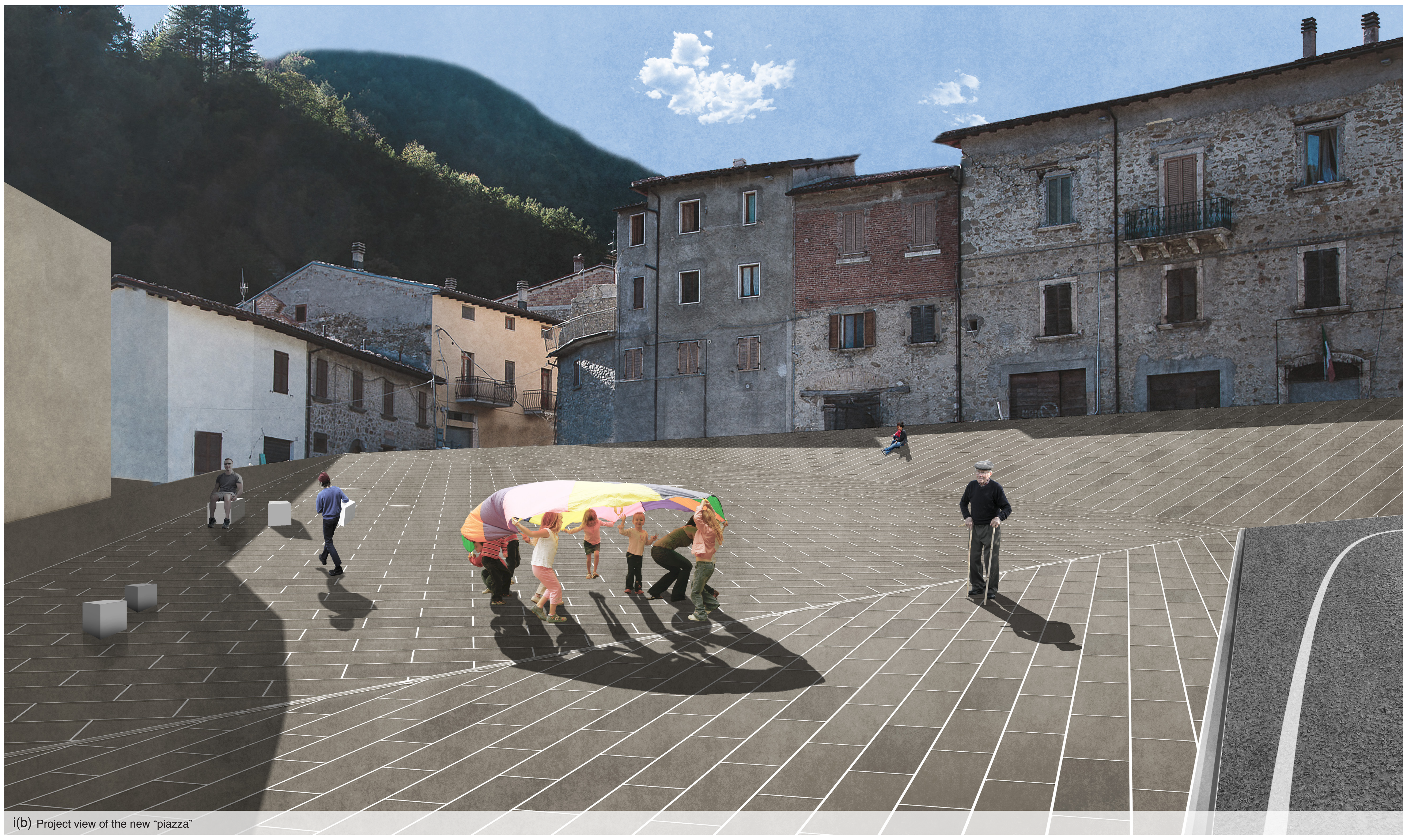
How satisfied are you with the space outside your accommodation, in terms of meeting places’ presence?



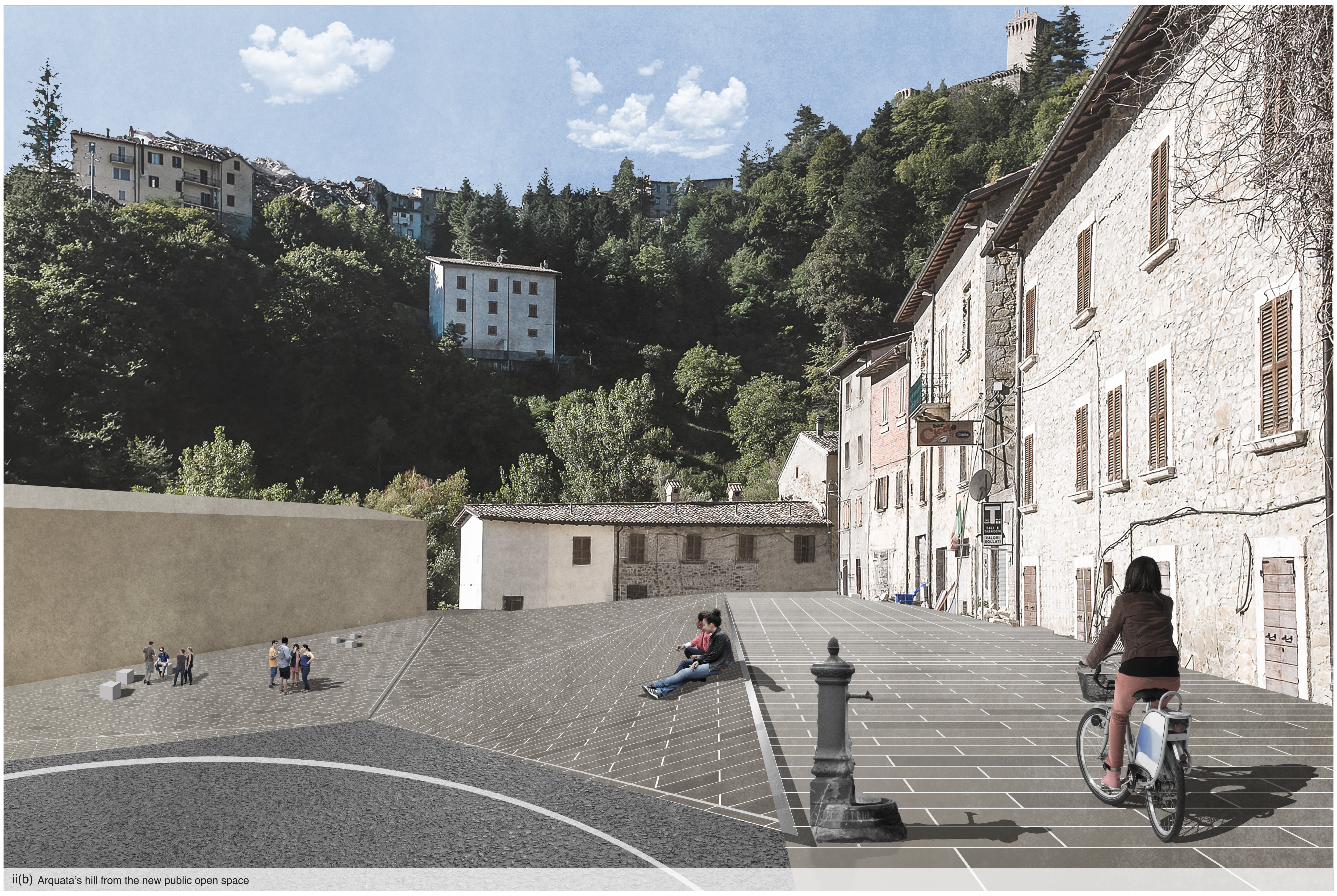
very dissatisfied (VD) I dissatisfied (D) I indifferent (I) I satisfied (S) I very satisfied (VS)

Do you think that a square might improve the quality of your life?




i(b) Project view of the new “piazza”

“[…] the big asset is movability. Chairs enlarge choice: to move into the sun, out of it, to make room for groups, move away from them. […] If you know you can move if you want to, you feel more comfortable staying put.” (White, 2001)


ii(b) Arquata’s hill from the new public open space

“The area where the street and the plaza or open space meet is a key to success or failure […] ideally, the transition should be such that it’s hard to tell where one ends and the other begins.” (White, 2001)